TA3588-PRC
Transjurisdictional Environmental Management - Component A

Local Legislation to Support Transjurisdictional Water Pollution Management

DRAFT

FINAL REPORT

May 2003

Submitted by

RMIT International Pty. Ltd.
Melbourne, Australia

In association with
Ulon Ltd
Hong Kong

To

Asian Development Bank
and
Environment Protection and Natural Resources Conservation Committee,
National People's Congress, PRC

Project No: 233082

ABBREVIATIONS

Institutional Abbreviations

ADB	Asian Development Bank
CCICED	China Council for International Cooperation in Environment and Development
DRIL	Detailed Rules for Implementation (of the WPPC Law)
EA	Executing Agency (NPC for Component A)
EPB	Environmental Protection Bureau
MWR	Ministry of Water Resources
NPC	National People's Congress
PPC	Provincial People's Congress
PRC	People's Republic of China
RBO	River Basin Organisation
RMIT	RMIT International Pty. Ltd., Melbourne, Australia
SEPA	State Environmental Protection Administration
TA	Technical Assistance
TOR	Terms of Reference
WPPC	Water Pollution Prevention and Control (Law)
WRPB	Water Resources Protection Bureau
YRB	Yellow River Basin
YRBWRPB	Yellow River Basin Water Resources Protection Bureau
YRCC	Yellow River Conservation Commission

Abbreviations used in the Management of this Component

International

TL	Team Leader & Institutional Development Specialist	(Dr. Edwin Ongley)
IELE	International Environmental Law Expert	(Mr. Peter Millington)

Domestic

DTL	Deputy Team Leader & Environmental Impact Assessment Expert	(Prof. WANG Xuejun)
EEE	Environmental Engineering Expert	(Prof. SHI Hang-Chang and Prof. ZHANG Xiaojian)
WSE	Water Science Expert	(Prof. WENG Jianhua)
WPPLE	Water Pollution Prevention Laws Expert	(Prof. CAI Shouqiu and Mr. LI Guangbing)
DEL	Domestic Environmental Laws expert	(Prof. WANG Xi and Prof. WANG Canfa)

Technical, Scientific and Other Abbreviations

BOD	Biological oxygen demand.	(measure of [wastewater] organic pollution)
COD	Chemical oxygen demand.	(measure of industrial organic pollution)
DO	Dissolved oxygen	
EDS	Endocrine disrupting substances.	
PAH	Polycyclic aromatic hydrocarbons	(group of designated toxic substances)
PCB	Polychorinated biphenols	(group of designated toxic substances)
TSS	Total suspended solids	
TVE	Township and village enterprise	
TVIE	Township and village industrial enterprise	

TABLE OF CONTENTS

APPENDICES

TA3588-PRC
Transjurisdictional Environmental Management – Component A
Conclusions and Recommendations

Transjurisdictional Water Pollution

EXECUTIVE SUMMARY

Introduction

This ADB Technical Assistance (TA) project focuses on management and control of transjurisdictional water pollution in the Yellow River Basin. Transjurisdictional water pollution has become a serious management concern throughout China having legal, technical, and administrative aspects requiring attention. Component A, is primarily concerned with the legal framework for transjurisdictional water pollution management.

"Transjurisdictional" has two main dimensions in this project – one is inter-provincial and the other is intra-provincial. Our recommendations reflect both dimensions. While Component A had a specific task to improve "local" (i.e. provincial legislation), the root cause of deficiencies in local legislation is in the national legislative framework from which local legislation is derived. Therefore, the project encompassed both national and local legislative issues.

Additionally, the project examined administrative arrangements and practices that either are derived from the legislative framework or which have been developed for dealing with transjurisdictional pollution management. This throws into sharp contrast the problems both in law and in practice on such issues as river basin planning, total load control, administrative coordination, and dispute resolution that, together, are responsible for lack of effective transjurisdictional water pollution management. We have, therefore, offered recommendations on substantive changes to law and practice in these various areas.

Administrative Arrangements at the Local Level

One of the specific tasks of this project was to examine administrative arrangements amongst the EPBs for dealing with transjurisdictional pollution issues. Generally, horizontal linkages between EPBs at the provincial level, and vertical linkages within individual provinces, works well for administrative purposes, although we note that local pollution disputes are frequently not adequately dealt with. In contrast, vertical and horizontal linkages amongst the EPBs between provincial jurisdictions is not functional due both to the lack of mechanisms for such linkages, and the tight control over local EPBs by, often, very protectionist local governments which have no accountability for downstream pollution caused within their jurisdiction.

The Model River Basin Legislation

As a way of demonstrating how local legislation might be improved to deal with transjurisdictional water pollution, the project developed a Model River Basin Legislation for the Fenhe River (Shanxi Province) with the cooperation and participation of local officials of Shanxi Province. This was based on an extensive review of local legislation in all nine provinces of the Yellow River, a legislative drafting seminar in which representatives from all nine provinces met in Beijing for a week to discuss and debate the basis for an adequate and appropriate legal framework for transjurisdictional pollution management, the requirement for pre-existing legislation, and the support of local officials who collaborated in the project.

The Fen River is the longest river in semi-arid Shanxi Province located in the middle portion of the Yellow River Basin. Shanxi Province is one of the most water deficient areas in China which, in 2002, began augmenting its water supply by a diversion from the Yellow River into the upper reaches of the Fen River. The Fen River is the second longest tributary of the Yellow River System, flowing for about 700 kilometres from north to south through 39 counties and six cities, and emptying into the Yellow River. This basin accounts for 25% of the area of the whole of Shanxi Province, 60% of the provincial GDP, and 41% of the population. The river is severely polluted with 100% wastewater during the dry season in parts of its course.

The key characteristics of the Fen River are:

- Total water resources of the basin are 3.36 billion m^3, the river flow is 2.527 billion m^3, and losses to evapo-transpiration and to groundwater are .853 billion m^3.
- Surface water flow primarily relies on rainfall,
- Seasonal change is quite noticeable; the average flow in dry seasons only accounts for 1/8 of the average annual flow, and the natural flow of some sections is extremely small that only accounts for 1/500.
- With the interception of reservoirs, the natural flow of upstream sections is noticeably smaller than middle stream and lower stream sections, only accounting for 2-5%.

The utilization characteristics of the water resources are:

- Nearly 80% of the river flow is used for agricultural irrigation.
- Groundwater is primarily used for industrial and domestic use. Exploitation of underground water accounts for 50-60% of the whole water supply, and up to 80% in upstream and middle stream areas.
- According to official plans, water diversions from the Fen River for industrial and domestic use will continue to increase in the foreseeable future. Additionally, aquaculture, agriculture as well as recreational uses will place additional stress on water supply.

To more effectively manage basin water pollution, the Shanxi provincial government developed the Fen River Regulations which came into effect in 1989. These were amended in 1997 to provide for:

- A focus on pollution prevention combined with pollution elimination and comprehensive pollution control
- Overall planning with linked responsibilities from provincial to local level administrations
- Polluters pay
- Principle of bringing discharge into conformity with standards.

However, the 1997 amendments have not, in general, successful in meeting the pollution control targets for a variety of reasons, chief of which are:

- Lack of comprehensive and integrated water environment and water resources planning and management;
- Inadequate specificity on planning and implementation measures;
- Poor institutional coordination

Our collaboration with provincial officials dealt with these deficiencies. The success of this collaboration is measured by the fact that a version of the model legislation has been sent to the Provincial Peoples Congress of Shanxi Province for amending the 1997 Regulations. The model legislation includes a number of provisions that would only be possible if the current national legislative framework were amended and which are, therefore, not considered in the version sent to the Shanxi Provincial People's Congress (PPC). In addition, we propose a number of "schedules" to the Model Legislation that provide guidance on technical matters such as waste permit trading, and on administrative mechanisms such as the operations of an executive body referred to here as the Water Environment Committee.

The model legislation applies to a river that is wholly contained within one province. The model can be adapted to interprovincial river basins by including some of the provisions that we have recommended for amending, in particular, the Water Pollution Prevention and Control (WPPC) Law.

National Legislative Framework

The issues and recommendations are drawn from an extensive set of research reports by the domestic consultants. Specific issues and recommendations were then debated by the project team over a period of one week. The whole team identified the requirements for new or revised information in the various laws. Legal text was drafted on the basis of consensus and mainly reflects the views of the four domestic environmental lawyers on the team. International context and examples were provided by the two international consultants on the team throughout the entire process.

The following tables outline the main issues and recommendations emerging from our study of transjurisdictional water pollution management in the PRC.

The main issues of concern lie in three major areas:

- National legal framework (re: transjurisdictional water pollution). This is mainly in the area of Interaction between the WPPC Law and the Water Law.
- Specific concerns with the WPPC Law.
- Administrative coordination.

Table 1: PRC LEGAL FRAMEWORK (WPPC and Water Laws) - Main Concerns and Recommendations

Main Concern	Recommendations
Lack of common terminology	Common terminology should be used in WPPC and Water Laws.
No cross-referencing of authorities that lie in other law(s) so no consistency between laws	Each law should reference the other law where both departments have a defined responsibility to the other.
Very short – with too much principle and too little detail on process and procedure (Compare with Western Laws)	For transjurisdictional issues, we have suggested revisions of the WPPC Law containing a higher level of detail concerning process and procedure.
Overlaps and inconsistencies between WPPC and Water Laws - Leads to duplication, conflicts, and poor coordination	This should be one area of discussion for the proposed Joint Ministerial Committee.

Table 2: WPPC Law - Main Concerns for Transjurisdictional Pollution Management

Main Concern	Recommendations
Generally, lack of detail leading to lack of clarity	**Entire WPPC Law needs to be examined to enhance clarity**. Currently, it provides little guidance for provincial regulations and leaves interpretation open to arbitrary decisions in administrative and judicial actions.
No legal basis for transjurisdictional pollution Currently, the only basis for actions by individuals or jurisdictions is on basis of "loss" or "damage". For many types of polluting events "damage" may be real but difficult to assess or prove until long after the event.	**Create Legal Definition Of Transjurisdictional Pollution.** Provides basis for administrative or judicial action. Establish inter-provincial transjurisdictional water environment standards based on a clear process. Create a process for defining a legal violation of the standard. Identify the obligation and rights of jurisdictions when transjurisdictional standards are violated according to dispute resolution provisions. **Note: Pollution "loss" or "damage" is retained as a basis of administrative or judicial actions whether transjurisdictional or not, and resolved according to the dispute settlement provisions.**
No accountability of upstream jurisdictions for water quality at downstream borders	Upstream jurisdictions become targets of administrative action when boundary water environment standards are violated, and may become liable for downstream damages.
Inadequate dispute settlement process Leads to arbitrary actions, no closure on disputes, little real accountability of officials, etc. • Definition of basis for dispute is required • Need a dispute process for individuals and working units • Need a dispute process for levels of government • Need to define the legal status of data in a dispute • Requirement for closure in a dispute	A new section on dispute resolution is proposed. This is in two parts: • Disputes amongst individuals and working groups, including transjurisdictional issues • Disputes between administrative jurisdictions
Inadequate provisions for basin planning and poor co-ordination for comprehensive water resources planning • need to harmonize and coordinate planning activities of SEPA and MWR with clear process and accountabilities leading to a comprehensive and integrated basin plan. • problem of lack of SEPA presence at basin level, therefore create a coordination committee at basin level • conflict and overlap in responsibilities of water and environment departments	A process is recommended that clarifies the responsibilities and interactions in developing a comprehensive basin plan. This includes a basin-level Joint Committee of the two ministries and provinces to act as a coordinating mechanism amongst the ministries, provinces and River Basin Organisation (RBO).
Provisions for total load control not clear • not a clear process for developing total loads • responsibilities of SEPA and MWR not well defined • process of notification and action is required	A process is proposed in which responsibilities of each of SEPA and MWR are clearly defined, and how the two ministries should interact in developing and implementing total load control measures.

Main Concern	Recommendations
Rights to access to information not clear • Need to define the right of access to information and right to know why request is denied • Need to prevent arbitrary decisions • Need for transparent policies for data access – confidentiality, cost, etc.	Transparent access to data, with clearly defined conditions of access, rights of denial, and right to know why access is denied.
Lack of information on data quality or legal status of data.	It is recommended that data should have legal status between jurisdictions and one jurisdiction cannot unreasonably delay administrative or legal actions on basis of source of data. Notwithstanding the Law on Metrication, the WPPC Law should require that all data meet legal standards for data quality.
Little real accountability of local officials who do not enforce the law for pollution control.	Jurisdictions may become liable for damages or violations occurring in their jurisdiction. However, the liability of officials is a much larger issue that is noted in our report but cannot be dealt with directly through the WPPC Law.

Table 3: Improved Administrative Coordination

Observation	Recommendation
Ministerial Level	
Water resources and water environmental management are now such a major issue for the PRC that the State Council can no longer ignore the present lack of effective administrative coordination by State Environmental Protection Authority (SEPA) and Ministry of Water Resources (MWR).	Following examples from many western countries, it is recommended that the State Council establish a **Joint Ministerial Committee** for Water Resources and Water Environment Management, chaired by a Vice Premier, to oversee the coordination of the WPPC and Water Laws, the harmonization of activities, elimination of wasteful and competitive practices such as monitoring, and harmonize the basin planning process.

Observation	Recommendation
Basin Level	
It is not the role of this TA project to recommend a basin-level administrative structure, however the current basin management situation in the People's Republic of China (PRC) (except for the Huai River basin) leads directly to transjurisdictional pollution problems due to: a) RBO is part of only one ministry (MWR) and has no accountability to SEPA. b) No representation in RBO by basin stakeholders. c) RBO has no jurisdiction for pollution control or transjurisdictional pollution management, only the responsibility to report monitoring data from provincial boundaries. d) No specific accountability of local governments for implementing administrative orders. e) lack of planning coordination between SEPA and MWR. f) Since 2002, SEPA is no longer represented at the basin level. g) WRPBs report pollution problems to SEPA but there are no provisions for an accountable process for an appropriate and timely response leading to a solution to the problem.	Modern river basin management in western countries is carried out by river basin organizations (RBOs) that are independent of specific ministries, representative of the basin stakeholders, and have planning, reporting, and coordination as their main responsibilities. RBOs normally rely on existing departmental structures to carry out operational activities such as hydraulic and hydrological works and waste control management according to the approved basin plan, and have no direct supervisory power over these operational activities or operational departments. We recommend two basin-level coordination groups: 1. A working level planning committee of SEPA and MWR to develop an integrating, operation, basin plan. 2. A leading group, consisting of SEPA, MWR and Vice-Governors of all provinces, to provide an executive body over the activities of the RBO and the activities of the environment department at the basin level and below.

Summary and Conclusion

Component A of this Cluster TA has provided a comprehensive framework for amending both national and local (provincial) legislation to better address transjurisdictional water pollution management. We have also addressed administrative arrangements and practices that flow from the texts and Implementing Rules of the two main laws (WPPC Law and Water Law). International precedent is cited wherever appropriate. There are three key issues that are at the root of transjurisdictional pollution issues in the PRC - one is the lack of attention and detail on administrative processes in these laws; the second is the failure to coordinate these two laws so that their provisions are mutually supportive, and the third is the unhealthy competition for jurisdiction between SEPA and the MWR. Administrative processes includes such areas as transjurisdictional planning and management mechanisms, basin-level management, dispute settlement mechanisms, high level coordination, accountability mechanisms, information transparency and dissemination, etc. All of these are reviewed with amendments proposed to the text of the current WPPC Law. Reference is also made to parallel changes that should be considered in the Water Law.

Finally, we are requested to comment on basin-level management, which is the key to transjurisdictional water pollution control. We have provided text on this subject in the main report. We note that a concurrent TA project is focused on the so-called Yellow River Law. It is our view that a law for the Yellow River Basin, if it is to be consistent with institutional reform in China and with international practice and experience, should reflect a larger national framework legislation that sets a course towards modern, representative, and inclusive river basin organizations, is consistent with modern river basin planning and management practices, and which leaves the actual management of pollution and water resources to those departments that have both the mandate and experience.

1. INTRODUCTION

1.1. Objective of the TA Cluster

The main objective of the TA is to assist the Government to operationalise transjurisdictional provisions of the revised WPPC Law of 1996, using the Yellow River Basin (YRB) as a case study. The other objectives of the TA are to assist the Government in (i) strengthening the environmental management in the Yellow River Basin through development of transjurisdictional administration, environmental standards and regulations, and environmental monitoring and enforcement mechanism; (ii) developing local legislation, rules, and regulations implementing the transjurisdictional provision of the Law (1996); and (iii) to examine the need of a national law to integrate various dimensions of river basin environmental management. To attain the objectives of the TA, three components have been identified. The three Components are (A) Legislation to Support Transjurisdictional Water Pollution Prevention and Control, (B) Procedure and Methodology for Transjurisdictional Water Pollution Management, and (C) Capacity Building for Transjurisdictional Water Pollution Management. This Interim Report refers only to Component A.

1.2. Background

1.2.1. Context[1]

In recent years, the State Environmental Protection Administration (SEPA) and the various provincial governments have realized that many pollutants are transported across provincial boundaries affecting areas several hundred kilometres from the source. With Asian Development Banks (ADB) assistance, the National Peoples' Congress (NPC) revised the Water Pollution Prevention and Control (WPPC) Law in 1996. Consideration of transjurisdictional pollution issues is one of the important features of the revised law. ADB also helped NPC to develop the capacity of provincial governments to disseminate local legislation appropriate to their local conditions within the framework of national legislation using the Land Administration Law (1998) as a case study.[2] Although national legislation addressing transjurisdictional water pollution exists, operational application to the actual field conditions is slow, primarily due to the lack of appropriate precedents and practical experience in the PRC.

Environmental management in the PRC is decentralized with the provincial and local governments' EPBs responsible for implementing and enforcing environmental standards, rules, and regulations. While river basin authorities were organized to address transjurisdictional issues related to the utilization of major river systems, the functional structure of those authorities primarily focuses on the construction of dams for hydroelectric power, flood control, bridges, and levees. The authority to address the causes and effects of transjurisdictional environmental problems is concentrated in the EPBs using environmental management strategies for local concerns. In special cases of conflict, the central Government may order the provincial EPBs to take necessary action.

[1] Much of the material in this section is taken directly from the ADB documentation that forms the Bank's TA justification and which is part of the project documentation.

[2] TA 3123-PRC: Provincial Legislation on Environmental Protection and Natural Resources Conservation, for $300,000, approved on 15 December 1998.

SEPA is primarily responsible for developing national environmental policies, standards, rules, and regulations that serve as the basis for the provincial and local governments to develop environmental management programs and strategies. Prior to the passage of the WPPC Law, the response of the Government to transjurisdictional pollution problems was to create a water resources protection bureau (WRPB) attached to the water conservancy commissions under joint authority of the Ministry of Water Resources (MWR) and SEPA. The WRPB monitors transjurisdictional water quality and in case of conflict prepares documentation for SEPA. SEPA presents the report and recommendations to the State Council, the last resort for dispute resolution if SEPA cannot resolve the conflict. In recent years, SEPA noted an increasing number of transjurisdictional conflicts, and is concerned that the use of existing mechanisms may be overloaded. In the absence of a dialogue mechanism among the concerned EPBs, the cause of the potential conflict is rarely removed or remedies instituted before conflict occurs.

To control pollution on the macro-level, SEPA is focusing on waste load reduction, and on the micro-level, ambient air quality and receiving water quality standards. If the assimilative capacity of the environment remains constant, waste load reduction will automatically improve the air and receiving water quality. Considering the stochastic nature of the environment's assimilative capacity, the decision makers have the option of continuing to focus on waste load reduction or increasing the water release in the river in order to meet the required environmental quality standards. However, the total waste load reduction concept caps the quantity of dilution that practically allocates the entire assimilative capacity to the upstream user.

In 2000 the Government started the Great West Development Program for the Western PRC to (i) accelerate infrastructure development, emphasizing rational development of water resources; (ii) strengthen ecological and environmental protection; (iii) develop industries based on their comparative advantages; and (iv) improve the scientific, technological, and educational capacity of staff. In response to the Government's initiative, ADB has programmed a number of TA grants and loans in the western region. A large portion of ADB's assistance is in the riparian provinces of the Yellow River, specifically, Gansu, Henan, Inner Mongolia, Shannxi, Shanxi, and Sichuan. The environmental impacts of ADB's projects have potential direct and indirect transjurisdictional effects or will be affected by pollutants across provincial boundaries.

Considering the Government's development thrust and ADB's assistance program, strengthening of the transjurisdictional environmental management system in portions of the middle and upper Yellow River will be used as a case study in this proposed TA. The experience and output of the case study will be useful in strengthening the transjurisdictional environmental management system in the six other major river systems as well as minor river systems affecting two or more provinces. Other concerns such as air and groundwater pollution control and prevention are more complex than surface water pollution and will require more extensive research. Nevertheless the mechanisms developed to solve transjurisdictional water pollution will be a useful reference and starting point in solving transjurisdictional air, groundwater, and toxic and hazardous waste pollution. Among the major river systems in the PRC, the Yellow River is the most complex in terms of hydrology, hydraulics, ecology, and human intervention. Strengthening the transjurisdictional environmental management system in the Yellow River will also highlight the importance of

proper natural resources conservation and utilization, in addition to industrial and urban wastewater management.

1.2.2. Physical Background[3]

The Yellow River has a total length of 5,464 kilometres (km) and a drainage area of 750,000 square km. It is the second longest river in the PRC after the Yangtze River. The middle section of the Yellow River passes through the loess and fine sand areas of Shaanxi and Shanxi provinces, where it picks up 1.6 billion tons of sediment load annually, resulting in a yellowish coloration even in periods of low flow. Although the middle section of the Yellow River has been the historical centre of ancient empires, presently 80 percent of the loess plateau is unpopulated or thinly populated because of soil instability and unpredictable shift of the river course from siltation and erosion. Erosion has carved gullies 200-250 meters (m) deep in Shaanxi and Shanxi provinces. Control of erosion by planting trees and grass has been very limited because of poor moisture-holding capacity of the loess and sand, as well as reckless destruction of the young trees for fuel and grass. Vegetation that survives drought is often washed out in the next storm. In spite of the recurrent flooding and drought, the lower reaches of the Yellow River are heavily populated and extensively cultivated. The lower reaches of the Yellow River pass through the North China Plain where 400 million tons of the sediment is unloaded. To control the annual flooding, levees are built higher every year. In a number of sections, the riverbed is higher than the surrounding areas. In Kai Feng City, the Yellow River high and low water marks are 12 m and 5 m above the surrounding countryside. In the 5,000 years of Chinese recorded history the Yellow River overtopped the levees 1,500 times and changed course drastically 26 times.

The average annual flow in the Yellow River is 58 billion m^3, 37.6 billion m^3 is diverted for irrigation, 6.4 billion m^3 is used by industries and cities within the watershed, and 4.1 billion m^3 is diverted to cities outside the watershed, such as Qingdao and Tianjin. Water consumption in the North China Plain is increasing by 4.7 percent annually. In 1970 the river ran dry in Shandong province for 21 days, in 1996 for 133 days, and in 1997 for 226 days. The population in the Yellow River Basin is 118 million; 48 million live in urban centres and 70 million in rural villages. Industrial and commercial activities in the area are also very high. In 1990, 50 percent of the coal supply and 25 percent of the crude oil in the PRC were extracted from the Yellow River Basin; especially the middle reaches.

In 1998, 47.1 percent of the river section monitored by SEPA showed high pollution levels with the water quality lower than Category IV (water bodies for general industrial supply and non-contact recreation). The major water pollutants are suspended solids, COD, and ammonia nitrogen. The suspended solids concentration in the Ningxia section exceeds the SEPA standard by 5 to 58 times. In 1985, the water in 81.2 percent of the Yellow River section stretch complied with drinking water standards; today only 29.2 percent complies. In the 1980s, 2.17 billion m^3 of untreated domestic and industrial wastewater were discharged into the Yellow River, increasing to 4.2 billion m^3 in the 1990s. The environmental degradation in the Yellow River is typical of major transjurisdictional rivers in the PRC.

[3] This information is part of the ADB Project background information. A detailed analysis of the current status of water quality of the Yellow River is presented in Chapter 2.

2. WATER QUALITY OF THE YELLOW RIVER

2.1. Volume of the Water Resource

In 1998, total volume of utilizable water resources in the basin was 67.83 billion m^3 and is close to the annual average. Surface water was 55.16 billion m^3, ground water was 39.4 billion m^3, and 26.38 billion m^3 was counted repetitively in surface water and ground water.

Table 1 is the volume of utilizable water resources by administrative regions.

Table 1: Volume of water resource utilizable in each province of the Yellow River basin (100 million m3)

Province (region)	Counted area (km2)	Precipitation per year	Volume of Surface water	Volume of ground water	Counted repetitively	Volume utilizable	Water yield coefficient	Water yield mode number (108m3/km2.a)
Qinghai	152705	605.9	196.7	85.42	82.31	199.8	0.33	13.08
Sichuan	16980	166.6	48.94	7.668	7.668	48.94	0.29	28.82
Gansu	142551	696.6	83.46	48.62	42.68	89.40	0.13	6.27
Ningxia	51088	161.0	9.172	30.87	28.80	11.24	0.07	2.20
Inner Mongolia	151274	435.1	18.54	54.46	20.47	52.53	0.12	3.47
Shanxi	97447	505.8	38.11	44.05	20.40	61.76	0.12	6.34
Shaanxi	133299	732.6	87.34	64.17	35.78	115.7	0.16	8.68
Henna	36033	267.2	41.31	39.99	17.17	64.14	0.24	17.80
Shandong	13335	105.1	28.04	15.19	8.480	34.75	0.33	26.06
Total	**794712**	**3676**	**551.6**	**390.4**	**263.8**	**678.3**	**0.18**	**8.53**

2.2. Water Resource Characteristics

Runoff of the Yellow River has the common characteristic of a northern river - uneven regional distribution, concentrated seasonal distribution, and large inter-annual differences. Moreover, the Yellow River has other unique characteristics, for example, less water and more sand transported, different sources of water and sand, longer yearly period of low water.

2.2.1. Hydrological Characteristics

Regional distribution of runoff in the Yellow River is very uneven. Basin area above Lanzhou makes up 30 percent of basin area above Huayuankou. Volume of inflow from the basin above Lanzhou accounts for 58 percent of that from the basin above Huayuankou. Inflow of sand from the basin above Lanzhou makes up 9 percent of that from the basin above Huayuankou. Clean water of the Yellow River mainly comes from the basin above Lanzhou. In the section between Ningxia and Inner Mongolia, inflow into this section is small and has high evaporation and leakage. In the lower section of the Yellow River where it flows across the North China Plain, the bed of the river is higher than the surrounding land due to sedimentation and containment of the river within historical levees which precludes tributaries in that zone.

The Yellow River basin is typical of monsoon regions with pronounced seasonal changes. Precipitation with large yearly and monthly change leads to uneven yearly and monthly distribution of river runoff. Distribution of river runoff is very concentrated. River runoff in mainstream and main tributaries from June to October of the flood season accounts for more than 60 percent of river runoff of a typical year. Floods occur very often in this period. Sand contained in the water in middle and downstream in flood season is very high, so it is very difficult to use the river water for beneficial uses. In non-flood season, sand contained in the water is very low and the river is supplied mainly by ground water with the result that most river runoff is available. Since the union of Longyangxia Reservoir and Liujiaxia Reservoir in 1986, runoff process of the downstream section has changed. The ratio of river flow in flood season to river flow for the year has decreased to 45% from 60%. The ratio of river flow in non-flood season to river flow for the year has increased to 55% from 40%. That change has relieved the problem of concentrated monthly river runoff.

Since the beginning of monitoring of Yellow River discharge there have been three continuous low water periods. Among them, the continuous low water period from 1922 to 1932 is 11 years; the continuous low water period from 1990 to 1999 is 10 years. The continuous low water period is a protrusive characteristic of river runoff of the Yellow River.

2.2.2. Sediment Transport - Less water and more sand

Although the Yellow River is the second river in China, total runoff of the Yellow River makes up only 2% of all river runoff in China. The Yellow River is the fourth river of seven rivers (the largest three rivers are Yangtze, Pearl and Songhua Rivers). The average runoff depth of the Yellow River above Huayuankou in many years is 77 mm. It is 28 percent of the average runoff depth of all rivers in China, which is 276mm. volume of water per capita in the Yellow River and is only 543 m^3, which is 25 percent of volume of all rivers' runoff per capita in China.

The Yellow River is world famous for its extraordinarily high sediment concentration. Average transported sand yearly in many years was 1.6 billion tons. Average sand contained in the water in many years is 35mg/m^3. The Yellow River is the first river in all rivers of China. Maximum transported yearly was 3.9 billion tons, which happened in 1993. Maximum sand contained in the water was 911 mg/m3, which happened in 1997.

Water runoff of upper, middle and lower sections accounts for 54%, 43% and 3% runoff of the Yellow River respectively. However, more than 90 percent of sand comes from the middle section of the Yellow River. The basin from Hekou Town to Longmen is only 110,000 km^2 and volume yield of that basin is only 7.3 m^3, which accounts for 13 percent of runoff of Huayuankou. In comparison, transported sand of that basin is about 0.9 billion tons and accounts for 56 percent of transported sand of the entire Yellow River Basin.

2.3. Water Quality Assessment of the Yellow River Basin

2.3.1. Water Quality Assessment by Section

According to monitoring data for water quality in the Yellow River in 2001[1], there were 175 assessed sections, including 29 main current sections. Data is for 12 parameters, including: Dissolved Oxygen, Permanganate Index, Biological Oxygen Demand, Volatile Phenols, Nonionic Ammonia, Petroleum and so on. Figure 1 shows water quality assessment by section in the Yellow River. Water quality of 87.9 percent of the sections was worse than Grade III including 62.9 % of sections, which were Grade V and worse than Grade V. In 2001, pollution of the Yellow River was comparatively serious.

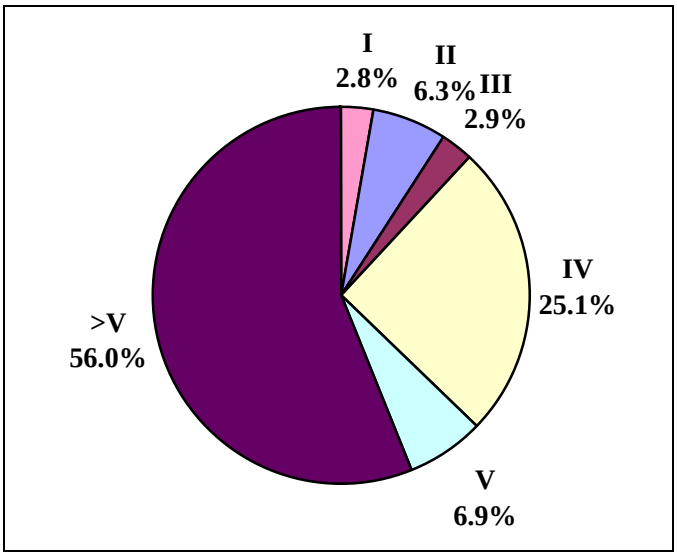


Figure 1: Water quality assessment as % of monitored sections, 2001

Water quality assessment of the Yellow River mainstream:
The percentage of 7 monitoring sections in the mainstream that have met the standards for Grades II, III, IV and V was 13.8%, 3.4%, 44.8%, and 10.3% respectively. 27.6% were worse than Grade V. 82.7 percent of sections were worse than Grade III. 37.9 percent of sections met Grade V standard or lower. The major pollution indices were Dissolved Oxygen, Permanganate Index, Biological Oxygen Demand, Volatile phenols and Petroleum. Suspended substances of the mainstream of Yellow River were very high. The maximum was 4851 mg/l. On the whole, the pollution in the mainstream of Yellow River was slightly better that that of 2000 when the water quality was even worse

2.3.2. Water Quality Assessment by Length

Water quality assessment of the Yellow River basin by length is based on the monitored results of 2001 [2] .

- Assessment range: assessment range included mainstream and main tributaries, such as Fenhe River, Weihe River, Yiluo River, Qinhe River, Dawen River, Huangshui River and Wuding River. There were 23 tributaries in total, 31 sections in mainstream, and 52 sections in tributaries of the Yellow River. The assessed river length of the mainstream was 7497 km^2, which was 48.2 % of total river length. The assessed river length of tributaries was 3884 km^2, which was 51.8 % of total tributary length.

- Assessment parameters: assessment parameters were: pH, Nitrite Nitrogen, Dissolved Oxygen, Permanganate Index, Biological Oxygen Demand, Total Cupreous, Total Lead, Total Zinc, Total Cadmium, Arsenic, Total Mercury, Chromic (6+), Total Cyanide, Volatile Phenols, Fluoride and so on. Total were 17 parameters.
- Assessment Standards: according to ***<environmental quality standard of surface water GB3838-88>***, water quality of the Yellow River was assessed by full water period, low water period and year.

Assessed river length was 7497 km^2 in 2001. The length with the water quality from Grade I to III levels was 2380 km^2, which accounted for 31.7%. The length with the water quality worse than Grade III was 5117 km^2, which accounted for 68.3%. Figure 2 shows percentage of river length by water quality grade.

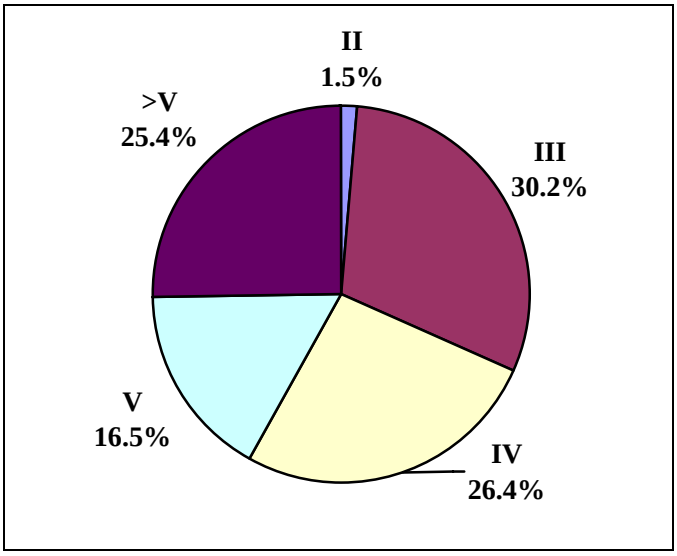


Figure 2: Water quality assessment as % of river length, 2001

In the full water period, the length with the water quality from Grade I to III was 2670 km^2, which accounted for 35.6%. The length with the water quality worse than Grade III was 4827 km^2, which accounted for 64.4%. It is shown in Figure 3.

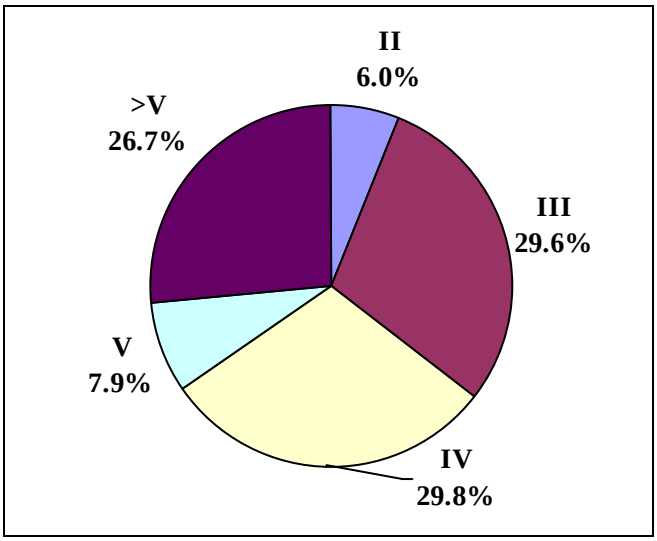


Figure 3: Water quality assessment as % of river length in low water, 2001

In the low water period, the length with the water quality from Grade I to III was 2212 km^2, which accounted for 29.5%. The length with the water quality worse than Grade III was 5285 km^2, which accounted for 70.5%. It is shown in Figure 4.

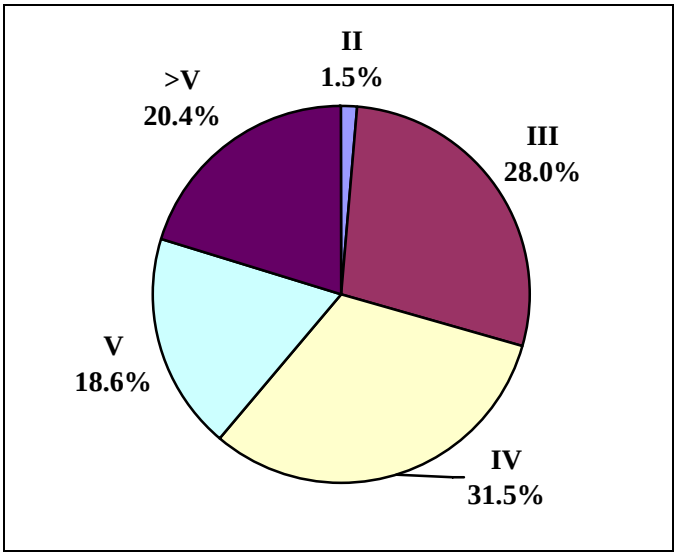


Figure 4: Water quality assessment as (%) of river length, 2001

Water Quality Assessment for Mainstream of the Yellow River

Assessed river length of the mainstream was 3613 km^2 in 2001. The length with water quality from Grade I to III for the full year was 1772 km^2, which accounted for 49.0%. The length with the water quality worse than Grade III all the year was 1841 km^2, which accounted for 51.0%. The length with water quality worse than Grade III mainly occurred from Shizuishan (Ningxia) to Wuda Bridge (Ningxia) section, from Sanhu River Outfall (Inner Mongolia) to Dengkou (Inner Mongolia) section, from Longmen (Shaanxi) to Sanmenxia (Henna) section, from Huanyuankou (Henna) to Gaocun (Shandong) section. Main pollutants were Permanganate Index, Biological Oxygen Demand, Total Lead, Ammonia Nitrogen and so on. Among them, water quality of Shizuishan, Sanhu River Outfall, Tongguan, Sanmenxia was Grade V. Figure 5 is the assessment result.

In the low water period, the length with the water quality from Grade I to III was 1857 km^2, which accounted for 51.4%. The length with the water quality worse than Grade III was 1756 km^2, which accounted for 48.6%. The length with the water quality worse than Grade III mainly occurred from Yesheng Bridge (Ningxia) to Wuda Bridge (Ningxia) section, from Sanhu River Outfall (Inner Mongolia) to Lamawan (Inner Mongolia) section, from Longmen (Shaanxi) to Sanmenxia (Henan) section, from Huayuankou (Henan) to Gaocun (Shandong) section. Main polluting items were Permanganate Index, Biological Oxygen Demand, Ammonia Nitrogen and so on. Among them, water quality of Tongguan section was Grade V, and water quality of Shizuishan section was worse than Grade V.

In the full water period, the length with the water quality from I to III Levels was 1729 km^2, which accounted for 47.9%. The length with the water quality worse than Level III was 1884 km^2, which accounted for 52.1%. The length with the water quality worse than Level III mainly lay from Sanhu River Outfall (Inner Mongolia) to Lamawan (Inner Mongolia) section, from Longmen (Shaanxi) to Xiaolangdi Dam section, from Huayuankou (Henan) to Gaocun (Shandong) section. Main polluting items were Permanganate Index, Ammonia Nitrogen, Lead, and so on. Among them, water quality of Sanhu River Outfall, Zhaojun Grave, Tongguan section was Grade V, and water quality of Sanmenxia section was worse than Grade V.

2.3.3. Water Quality Assessment for Tributaries of the Yellow River

Assessment length of the Yellow River's tributaries was 3884 km^2. In 2001, the length with the water quality from Grade I to III all the year was 608 km^2, which accounted for 15.7%. The length with the water quality worse than Grade III all the year was 3276 km^2, which accounted for 84.3%. Polluted rivers mainly were Qingshui River, Yinxin Ditch, Fen River, Sushui River, Wei River, Honganjian River, Double Bridge River, Mang River, Qin River, Dawen River. Water quality of those rivers was worse than Grade V all the year. Figure 5 shows the assessment result. Main pollutants were Ammonia Nitrogen, Volatile Phenols, Permanganate Index, Biological Oxygen Demand, Dissolved Oxygen, Nitrite and so on.

In the low water period, the length with the water quality from Grade I to III all the year was 813 km^2, which accounted for 20.9%. The length with the water quality worse than Grade III all the year was 3071 km^2, which accounted for 79.1%. Water quality of Lijiacun of Yao River, Xiangtang of Datong River, Fen Reservoir of Fen River, Linjiacun of Wei River, Zhangjiashan of Jing River, Feiling of Qin River, Wulongkou, Xiecun of Banjian River, Shanghui of Huiqiing River, was Grade II or Grade III. Water quality of other section was Grade V or worse than Grade V. Main pollutants were Ammonia Nitrogen, Volatile Phenols, Permanganate Index, Biological Oxygen Demand, Dissolved Oxygen, Nitrite, Heavy Metals and so on.

In the full water period, the length with the water quality from Grade I to III all the year was 483 km^2, which accounted for 12.4%. The length with the water quality worse than Grade III all the year was 3401 km^2, which accounted for 87.6%. Main polluting items were Ammonia Nitrogen, Volatile Phenols, Permanganate Index, Biological Oxygen Demand, Dissolved Oxygen, Nitrite and so on.

Summary

According to the water quality assessment of the Yellow River in 2001, the length with the water quality from Grade I to III all the year accounted for 31.7%. The length with the water quality worse than Grade III all the year accounted for 68.3%. In the general, water quality of upstream was better than that of downstream; water quality of the mainstream was better than that of tributaries.

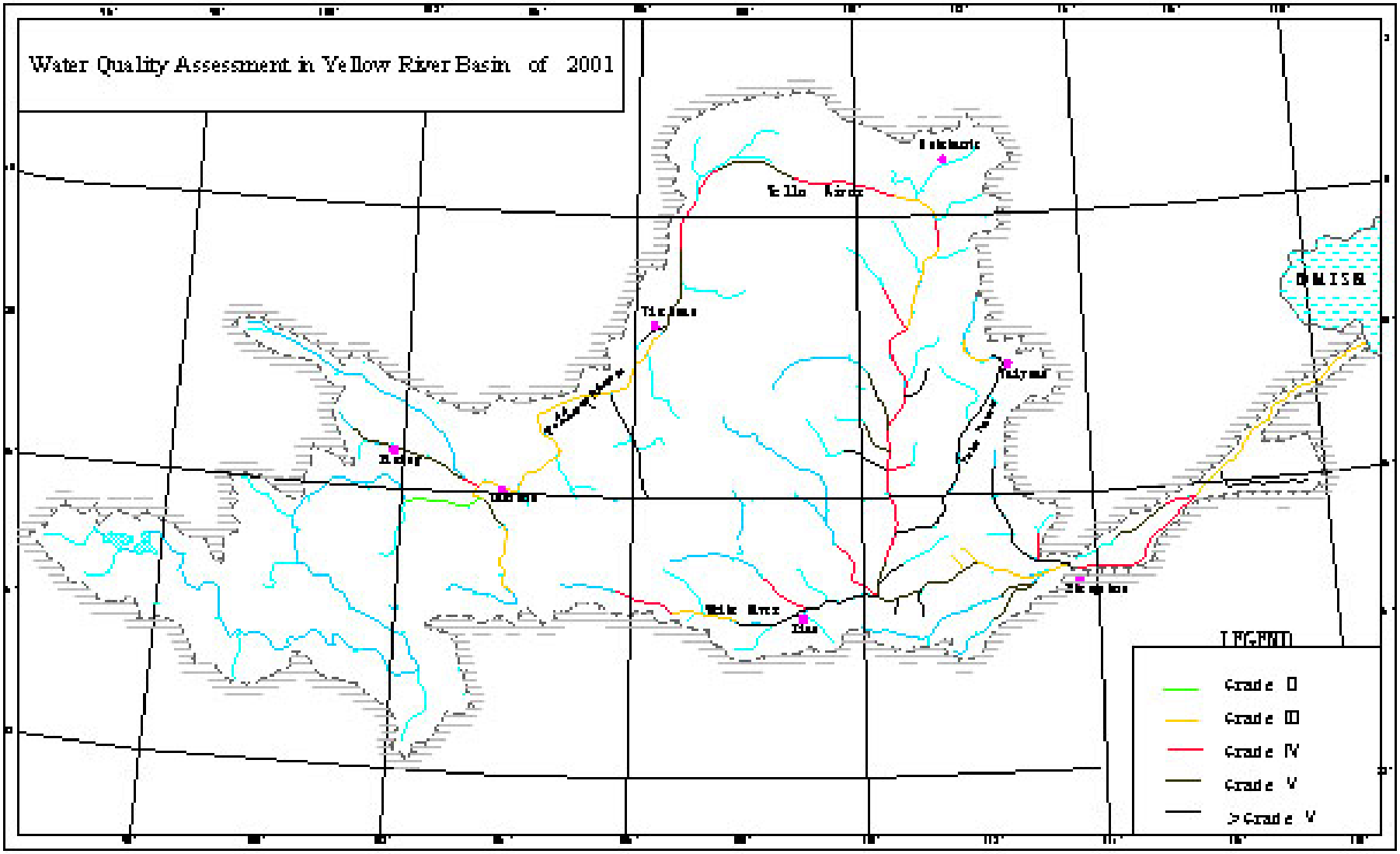


Figure 5: Water quality assessment for the Yellow River in 2001

2.4. Water Quality Assessment of Provincial Boundaries in the Yellow River Basin

The Yellow River rises in Qinghai and flows through nine provinces, which are Qinghai, Gansu, Sichuan, Ningxia, Inner Mongolia, Shanxi, Shannxi, Henan and Shandong. The Yellow River pours into Bohai Sea in Kenli County, Dongying, Shandong.

There are many provincial boundaries in the Yellow River basin. There are 10 river systems running through different provinces or influencing rivers of different provinces. For transjurisdictional water pollution analysis it is important to research the water quality of provincial boundary sections. According to Article 18 of the Water Pollution Prevention and Control Law of 1996, monitoring of water quality at provincial boundaries on the river gradually developed in the Yellow River basin.

2.4.1. Sections, Items and Method of Water Quality Assessment of Provincial Boundary's River

- Assessment sections: there were 30 sections of water quality assessment for provincial boundaries in 2001. Among them, 14 sections lay in the mainstream of the Yellow River; 16 sections lay in tributaries of the Yellow River. Figure 3 shows the distribution of assessment sections.
- Frequency for assessment: monthly sampling throughout the year.
- Assessment items: assessment items of water quality at provincial boundaries in the Yellow River system were Dissolved Oxygen, Permanganate Index, Biological Oxygen Demand (5 days), Nonionic Ammonia, Nitrite Nitrogen, Volatile Phenols, Total Cyanide, Arsenide, Chromic (6+), Total Mercury, Cadmium, Lead, Zinc, Fluoride and pH for a total of 17 items. As a referenced assessment item, Chemical Oxygen Demand was not included in the determination of water quality.
- Standards for assessment: it was assessed by ***environmental quality standard of surface water (GB3838-88)***.
- Assessment methods: single factor assessment method.

2.4.2. Water Quality Assessment for Provincial Boundaries in the Yellow River Basin

In 2001, 30 provincial boundary's sections were assessed for water quality. The provincial boundaries with the water quality from Grade I to III all the year accounted for 31.0%. The provincial boundary sections with the water quality worse than Grade III all the year accounted for 69.0%. More than 80 % of assessed sections were worse than Grade III. 37.0 percent of assessment sections were Grade V or worse than Grade V. The results are outlined in Table 2 for 2001.

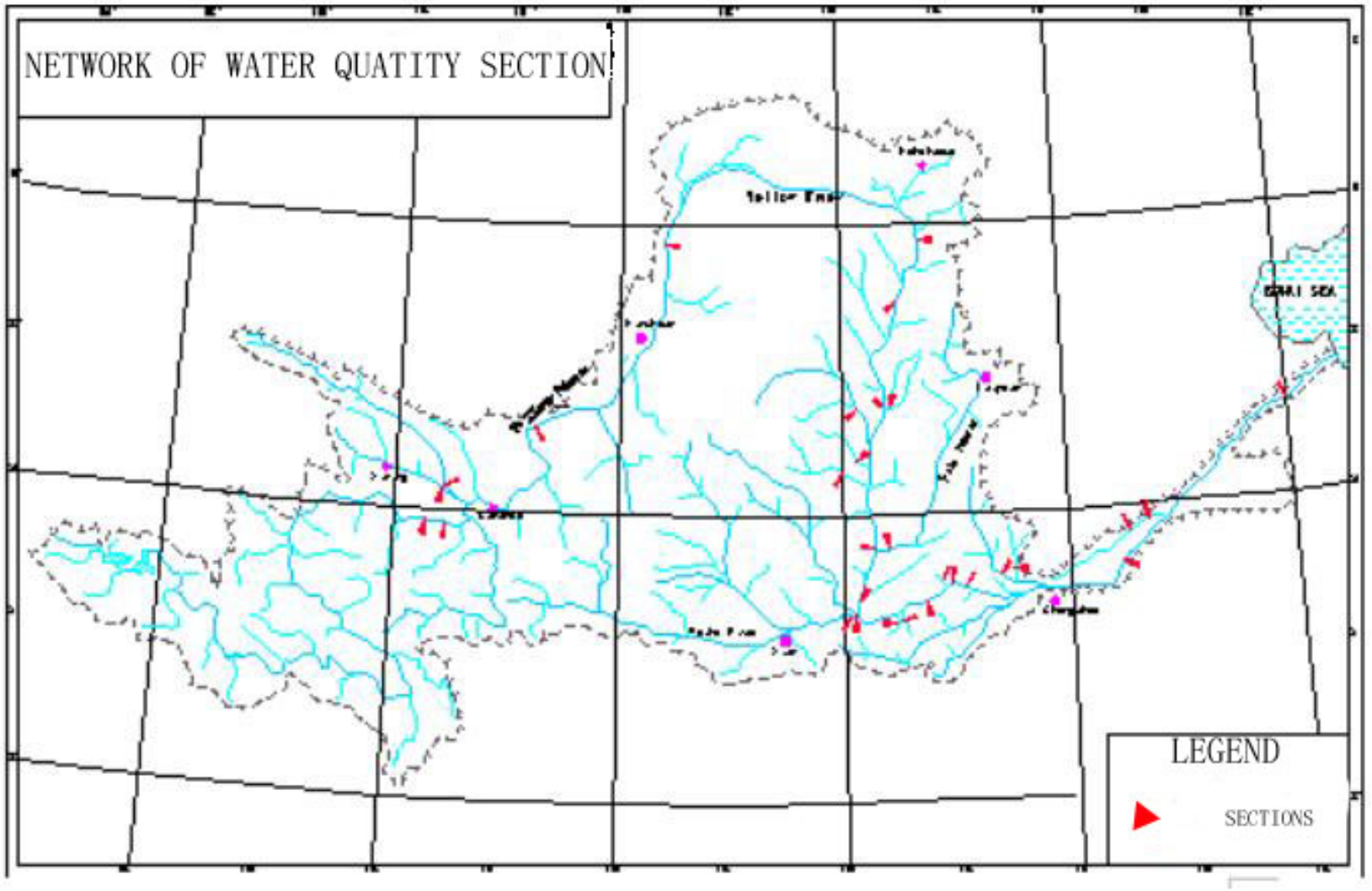


Figure 6: Network of Water quality sections at provincial boundaries of the Yellow River

In the assessment sections, water quality of 3 sections was comparatively better. They were Maqu section as background section of water quality, Dahejia section as provincial boundary of Qinghai and Gansu, Xiaheyan section as provincial boundary of Gansu and Ningxia. Water quality of those sections were better than Grade III all the year. Water quality of Xiaolangdi Dam as provincial boundary of Henan and Shanxi, Lijin section of the Yellow River remitting to Bohai Sea, Xiangtang section as Datong River's provincial boundary of Gansu and Qinghai, Shanghui section in Huiqing River as Shanxi tributaries remitting to the Yellow River, was better than Grade III in 60.0 to 80.0 percent of the year. Water quality of Wulongkou section in Qin River as provincial boundary of Shanxi and Henan was better than Grade III in 58.3 percent of the year. Water quality of Wubao section as provincial boundary of Shannxi and Shanxi, Xiecun section of Banjian River was better than Grade III in 50 percent of the year. Water quality of Wuda Bridge section as provincial boundary of Ningxia and inner Mongolia was better than Grade III in 41.7 percent of the year. Water quality of other sections of the provincial boundary were worse than Grade III more than 66.7 percent of the year.

Table 2: Subtotal of Grade of water quality at provincial boundaries in 2001

River Name	Section	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Probability of water quality (%)		
														Ⅰ、Ⅱ Ⅲ	Ⅳ	Ⅴ、 >Ⅴ
Yellow River	Maqu		Ⅱ				Ⅱ		Ⅱ				Ⅱ	100	0	0
	Dahejia	Ⅱ	Ⅱ	Ⅱ	Ⅱ	Ⅱ	Ⅱ	Ⅳ	Ⅱ	Ⅲ	Ⅱ	Ⅱ	Ⅱ	91.7	8.3	0
	Xiaheyan	Ⅲ	Ⅲ	Ⅲ	Ⅱ	Ⅲ	Ⅱ	Ⅲ	Ⅲ	Ⅲ	Ⅲ	Ⅲ	Ⅲ	100	0	0
	Wudaqiao	Ⅳ	Ⅳ	Ⅳ	Ⅲ	Ⅳ	Ⅳ	Ⅲ	Ⅲ	Ⅲ	Ⅳ	Ⅳ	Ⅲ	41.7	58.3	0
	Lamawan	Ⅲ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	>Ⅴ	Ⅳ	Ⅲ	Ⅳ	Ⅳ	Ⅳ	16.7	75.0	8.3
	Wubao	Ⅳ	Ⅳ	Ⅳ	Ⅲ	Ⅳ	Ⅲ	Ⅳ	Ⅴ	Ⅲ	Ⅲ	Ⅲ	Ⅲ	50.0	41.7	8.3
	Longmen	Ⅲ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅴ	Ⅳ	Ⅲ	Ⅳ	Ⅲ	25.0	66.7	8.3
	Tongguan	Ⅴ	Ⅳ	Ⅳ	Ⅳ	Ⅴ	>Ⅴ	>Ⅴ	>Ⅴ	Ⅴ	Ⅳ	Ⅳ	Ⅳ	0	50.0	50.0
	Sanmenxia	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	>Ⅴ	Ⅳ	Ⅳ	Ⅲ	8.3	83.3	8.3
	Xiaolangdi	Ⅲ	Ⅲ	Ⅳ	Ⅳ	Ⅲ	Ⅳ	Ⅲ	Ⅳ	Ⅲ	Ⅲ	Ⅱ	Ⅲ	66.7	33.3	0
	Huayuankou	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅴ	Ⅲ	Ⅳ	Ⅲ	16.7	75.0	8.3
	Gaocun	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅲ	Ⅲ	Ⅳ	16.7	83.3	0
	Lijin	Ⅲ	Ⅳ	Ⅲ	Ⅲ	Ⅲ	Ⅳ	Ⅲ	Ⅲ	Ⅲ	Ⅲ	Ⅳ	Ⅳ	66.7	33.3	0
Huangshui	Minghe	Ⅴ	Ⅴ	Ⅴ	Ⅴ	Ⅲ	>Ⅴ	>Ⅴ	Ⅴ	Ⅲ	Ⅲ	Ⅳ	Ⅴ	25.0	8.3	66.7
Datonghe	Hengtang	Ⅱ	Ⅱ	Ⅲ	Ⅲ	Ⅲ	Ⅴ	Ⅳ	Ⅳ	Ⅲ	Ⅲ	Ⅱ	Ⅱ	75.0	16.7	8.3

River name	Section	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Probability of water quality （%）		
														Ⅰ Ⅱ、Ⅲ	Ⅳ	Ⅴ、＞Ⅴ
Sanchuan	Houdacheng	Ⅳ	Ⅳ	Ⅴ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅲ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	8.3	83.3	8.3
Wuding	Xindian	Ⅴ	Ⅲ	Ⅳ	Ⅴ	＞Ⅴ	＞Ⅴ	Ⅴ	＞Ⅴ	Ⅴ	Ⅲ	Ⅲ	Ⅲ	33.3	8.3	58.3
Qingjian	Yancjuan	Ⅴ	Ⅴ	Ⅴ	Ⅳ	＞Ⅴ	Ⅴ	＞Ⅴ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	＞Ⅴ	0	41.7	58.3
Yanshui	Hujiachuan	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅴ	＞Ⅴ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅴ	0	75.0	25.0
Fenhe	Hejin	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	Dry	Dry	Dry	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	0	0	100
Sushui	Puchou	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	0	0	100
Weihe	Tiaoqiao	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	Ⅳ	Ⅳ	＞Ⅴ	0	16.7	83.3
Hongnongjia	Potou	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	0	0	100
Shuangqiao	Shuangqiao	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	＞Ⅴ	0	0	100
Banjian	Jiecun	Ⅲ	Ⅱ	Ⅲ	Ⅳ	Ⅳ	Ⅳ	Ⅳ		Ⅳ	Ⅱ	Ⅱ		50.0	50.0	0
Haoqinghe	Shanghaocheng	Ⅲ	Ⅱ	Ⅱ	Ⅲ	Ⅳ	Ⅲ	Ⅳ		Ⅲ	Ⅱ	Ⅱ		80.0	20.0	0
Xinhe	Wulongkou	Ⅳ	Ⅳ	Ⅲ	Ⅲ	Ⅳ	Ⅳ	Ⅲ	Ⅳ	Ⅱ	Ⅱ	Ⅱ	Ⅱ	58.3	41.7	0
Danhe	Dianchangqiao	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅲ	Ⅳ		Ⅳ	Ⅳ		10.0	90.0	0
Subtotal by month （%）	Ⅰ Ⅱ Ⅲ	33.3	28.6	25.9	29.6	23.1	18.5	22.2	22.2	42.3	51.9	37.0	48.0			
	Ⅳ	33.4	46.4	44.4	44.5	50.0	44.5	40.7	40.8	23.1	33.3	48.1	20.0			
	Ⅴ、＞Ⅴ	33.3	25.0	29.6	25.9	26.9	37.0	37.0	37.0	34.6	14.8	14.8	32.0			

2.4.3. Main Pollutants at Provincial Boundaries

Main pollutants at provincial boundaries were determined according to the percentage of pollutants that did not meet standards. They were Nonionic Ammonia, Biological Oxygen Demand (5 Days), Permanganate Index, Nitrite Nitrogen, Volatile Phenols, Chemical Oxygen Demand and so on. Table 3 is water quality of mainstream section as provincial boundary in the Yellow River basin.

Table 3: Water quality of mainstream section at provincial boundaries (upstream to downstream)

Provincial boundary	Section	Grade of water quality	Main Pollutants
Baseline station	Maqu	II	
Qinghai—Gansu	Dahejia	II	
Gansu—Ningxia	Xiaheyan	III	
Ningxia—Neimenggu	Wudaqiao	IV	NH_3
Neimenggu—Shanxi、Shannxi	Lamawam	IV	NH_3
Shannxi—Shanxi	Wubao、Longmen	IV	NH_3
Shannxi—Shanxi、Henan	Tongguan	V	NH_3, BOD, COD, Permanganate Index、Volatile Phenols
Henan—Shanxi	Sanmenxia	V	NH_3、NO_2-N, BOD, Volatile Phenols
Henan—Shandong	Gaoshu	IV	NH_3
Huangheruhaikou	Lijin	III	

According to polluting range and polluting extent, Non-ionic Ammonia was the most serious pollutant. In some sections, such as Maqu section as background section of water quality, Dahejia section as provincial boundary of Qinghai and Gansu, Xiaheyan section as provincial boundary of Gansu and Ningxia, Non－ionic Ammonia was not found. In other sections, Nonionic Ammonia was found. Distribution of Biological Oxygen Demand (5 Days).

Permanganate Index and Nitrite Nitrogen were comparatively widespread and could be found in upstream, middle stream and down stream. Polluting extent of Volatile Phenols was also comparatively serious. In addition, according to the stated result, pollution of Total Phosphorous mainly existed downstream of Wubao.

The section of heaviest pollution in the mainstream was Tongguan section at provincial boundaries of Shannxi, Shanxi and Henan. Water quality of that section was worse than Grade III all the year. Among them, 50 percent of the year was Grade V or worse than Grade V. Main polluting items were Nonionic Ammonia, Lead and so on. In 91.7 percent of the year, water quality of Sanmenxia section, the provincial boundary of Henan and Shanxi, was worse than Grade III.

Water pollution of some sections was very serious. They were Hejin section in Fen River of Shanxi tributaries flowing to the Yellow River, Puzhou section in Sushui River, Potou section in Hongnongjian River of Henan tributaries flowing to the Yellow River, Double Bridge section in Double Bridge River, Taiqian Bridge section as provincial boundary of Henan and Shandong. Water quality of those sections was worse than Grade Ⅴ. Main polluting items were Dissolved Oxygen, Nonionic Ammonia, Permanganate Index, Biological Oxygen Demand (5 Days), Nitrite Nitrogen, Volatile Phenols, Fluoride, Total Mercury, Cadmium, Lead and Zinc.

2.4.4. Yearly Change of Water Pollution at Provincial Boundaries

Figure 7 presents statistical results of water quality at provincial boundary sections in different periods of the year. In July and August of full water period and June of low water period, water pollution at provincial boundary sections was more serious in the Yellow River. In July and August, the sections with water quality worse than Grade III accounted for 77.8 percent of monitored sections. Among them, the sections with water quality worse than Grade V accounted for 37.0%. In July, the sections with water quality worse than Grade III accounted for 81.5 percent of monitored sections. Among them, the sections with water quality of Grade V and worse than Grade V accounted for 37.0%. In 2001, the reason for serious pollution in the Yellow River was severe drought over the entire valley, and less river runoff. June and July were the lowest water season. In this period, the direct relation between pollution and runoff was very large; self-cleaning capacity decreased, so, water quality of the Yellow River was very poor. In August, the reasons for serious pollution were pollutants of non-point source origin carried by flood in the flood season and stored pollutants in the river course in the low water season.

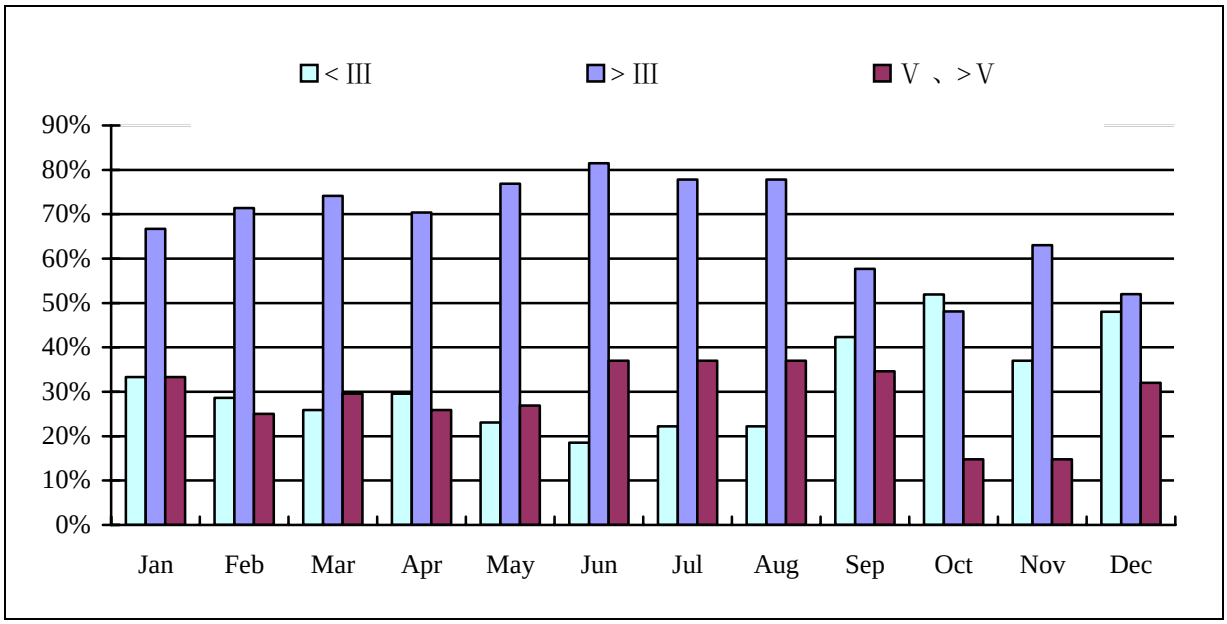


Figure 7: Yearly change of water quality at provincial boundaries in the Yellow River, 2001

2.4.5. Summary

According to the monitoring results, water pollution at provincial boundary sections is very serious. Except for the background section, most provincial boundary sections were polluted to different extents. That led to a decrease of the water body's function. Especially in subsidiary currents, most have lost their ability to function as water bodies and become wastewater ditches.

In 2001, water quality at provincial boundary sections in the Yellow River basin deteriorated further. In 2001, the sections with water quality worse than Grade III accounted for 75.9% compared with 70.0% in 2000. The serious pollution period was June of low water season, and July and August of full water season. In provincial boundary sections in mainstream of the Yellow River the main pollutant was Biological Oxygen Demand. In provincial boundary sections in tributaries, as well as Biological Oxygen Demand, Volatile Phenols were also a main pollutant. Sections of water pollution were concentrated in middle and down stream reaches of the Yellow River involving Shanxi, Shaanxi, Henan, Shangdong and so on.

2.5. Water Quality Assessment for Main Municipal Water Supply Source in the Yellow River

Water quality of ten main municipal water supply sources was assessed. The ten main municipal water supply sources were Xinchengqiao (Lanzhou), Shizuishan (Shizuishan), Zhaojun Grave (Baotou), Huajiangying (Huhehaote), Dengkou (Zhengzhou), Toudaoguai (Puyang), Gaocun (Jinan), Luokou (Dongying), Lijin (Binzhou). Table 4 shows the assessment result. According to the table, in 2001, the main municipal water supply source with water quality worse than Grade III accounted for 60 percent. That is, water quality of those water supply sources did not meet the minimum function demand of a water supply source. Main pollutants were Nonionic Ammonia, Biological Oxygen Demand (5 Days), Permanganate Index and Volatile Phenols.

Table 4: Water quality of municipal water supply sources in selected main cities in 2001

City	Section	Grade of water quality	Main Pollutants
Lanzhou	Xinchengqiao	Ⅲ	
Shizuishan	Shizuishan	Ⅴ	COD_{Mn} BOD phenols
Baotou	Zhaojunfen	Ⅳ	COD_{Mn}
Baotou	Huajiangying	Ⅳ	COD_{Mn}
Baotou	Dengkou	Ⅳ	COD_{Mn}
Huhehaote	Toudaoguai	Ⅲ	
Zhengzhou	Huayuankou	Ⅳ	NH_3
Puyang	Gaocun	Ⅳ	NH_3
Jinan	Lekou	Ⅲ	
Dongying、Binzhou	Liji	Ⅲ	

2.6. Monitoring of Toxic Organic Compounds in the Yellow River

Until recently, monitoring of trace organic compounds was ignored. The new ***Surface Water Environmental Quality Standard GB3838-2002*** has 109 Monitored items. Among them there are 68 monitored items of toxic organics, including Organic Pesticide, Organochlorine, Nitrobenzene Category, PCB and Benzopyrene of PAHs. However, these organic compounds are optional and, moreover, most monitoring laboratories have no equipment to do these. So monitoring of toxic organic compounds does not occur regularly in the Yellow River.

However, some monitoring of toxic organic compounds has been done. In 1997 an investigation on distribution of trace organic pollutants was completed. The following are the main contents.

1. Methods: in some sections of main river and main tributaries of the Yellow River, trace organic compounds were monitored by GC/MS and GC.
2. Monitored sections: five sections lie in the main stem of the Yellow River. Among them, two sections lie in the upstream, two sections lie in the middle stream and one section lies in the downstream. Four sections are in tributaries of the Yellow River - the Fenhe River, Weihe River, Luohe River and Manghe River.
3. Monitored results: category and distribution of trace organic compounds in every section are listed as follows:
    - 79 trace organic compounds were found in upstream sections, including 15 PAHs, 13 kinds of Hydrocarbon Category, 12 kinds of Phenols and 12 kinds of Substituted Benzenes.
    - 60 kinds of organic compounds were found in middle stream sections, the front three compounds were 13 kinds of Substituted Benzenes, 9 kinds of Phenols and 8 kinds of Alcohol and trimethylbenzene.
    - 41 kinds of organic compounds were found in the downstream sections, including 8 kinds of Phenolphthalein Ester Category, 7 kinds of Phenols and 7 kinds of Substituted Benzenes.
    - 44 kinds of organic compounds pollutants were found in Weihe River section, including 9 kinds of Phenolphthalein Ester Category, 9 kinds of PAHs, 5 kinds of Phenols and 5 kinds of Substituted Benzenes.
    - 65 kinds of organic pollutants were found in Fenhe River section, including 11 kinds of Hydrocarbon Category, 10 kinds of Phenols, 9 kinds of Substituted Benzenes and 9 kinds of PAHs.
    - 64 kinds of organic pollutants were found in Luohe River section, including 14 kinds of PAHs, 11 kinds of Phenols, 9 kinds of Hydrocarbon Category and 9 kinds of Phenolphthalein Ester Category.
    - Results of GC quantitative analysis of trace organic compounds in several main currents sections: the maximum concentration average is Phenols, and then Phenolphthalein Ester Category, Amines, Furans, PAHs.

- Results of GC quantitative analysis of trace organic compounds in several subsidiary currents sections: the maximum concentration average is Phenols, and then Phenolphthalein Ester Category, Furans, Amines, Alcohol and trimethylbenzene.

In general, pollution by trace organic compounds is serious in the Yellow River.

2.7. Trend Analysis of Water Quality of the Yellow River Basin

Trend Analysis of water quality is an important part in water quality assessment. In this paper, trend analysis of water quality of the Yellow River is carried out for two time periods.

1. Short term (2-3 years) Trend Analysis
2. Long term (7-12 years) Trend Analysis

2.7.1. Short Term Trend Analysis in the Mainstream of the Yellow River

Water quality in mainstream of the Yellow River in the most recent three years was analyzed. The river length with water quality worse than Grade III in 1999, in 2000 and in 2001 was respectively 1638 km^2, 1636 km^2 and 1848 km^2, which accounted for 45.3%, 45.3% and 51.0%. Compared with the previous two year, in 2001 the river length with water quality worse than Grade III increased slightly; the growth rate was 5.7%. It may be inferred that in 2001 the pollution in the mainstream of the Yellow River increased and water quality declined. Figure 8 and Figure 9 illustrate the length variations with different water quality in 1999, 2000 and in 2001.

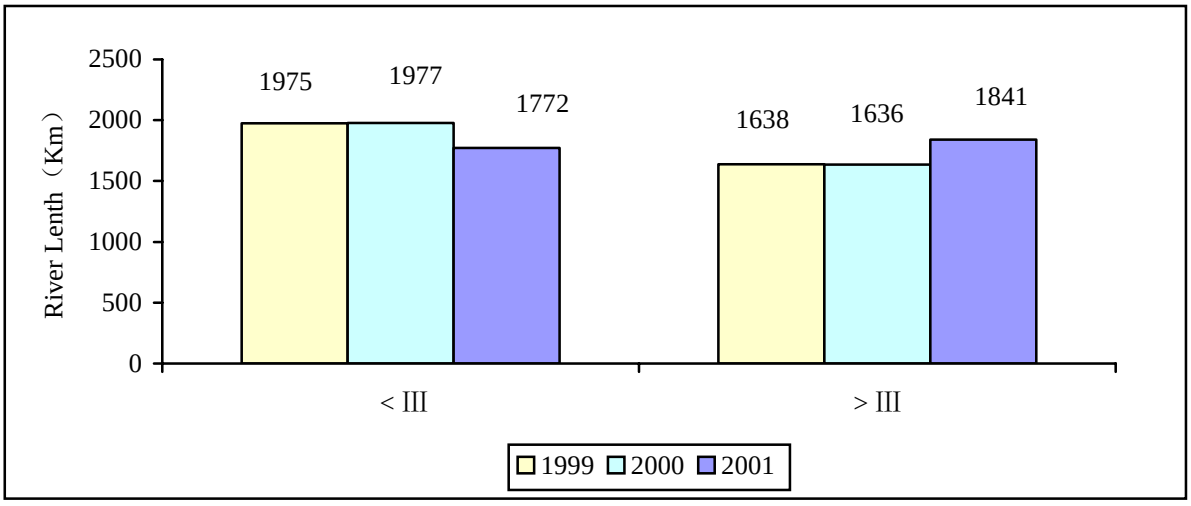
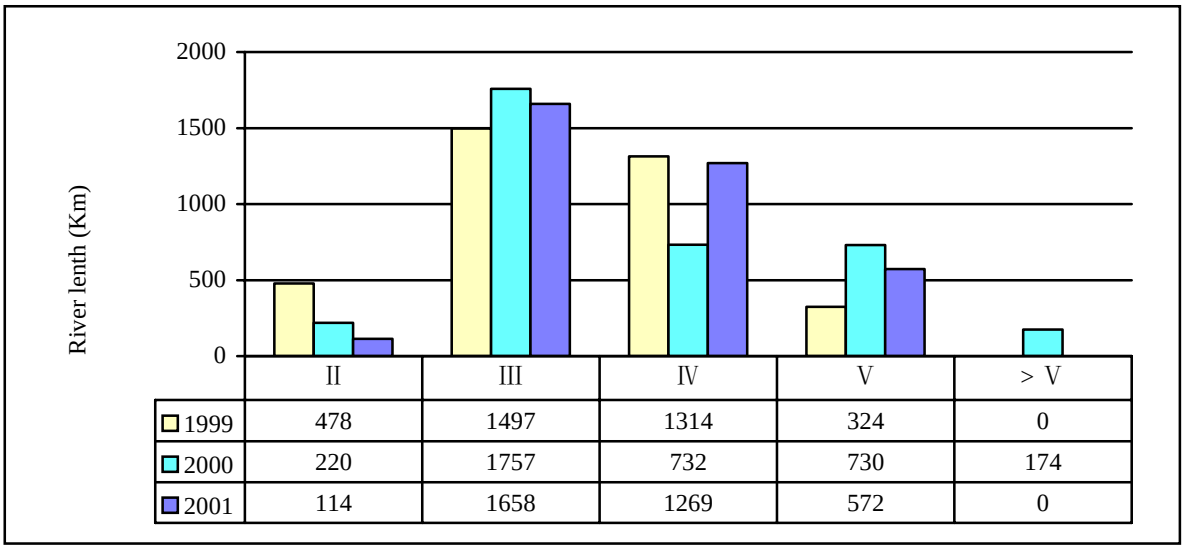


Figure 8: Water Quality of Main Stream of the Yellow River in 1999,2000,2001



	II	III	IV	V	> V
1999	478	1497	1314	324	0
2000	220	1757	732	730	174
2001	114	1658	1269	572	0

Figure 9: Water Quality Assessment by River Length in Main Stream of the Yellow River in 1999, 2000, 2001

2.7.2. Long Term (7-12 Years) Trend Analysis of the Yellow River

Long-term trend analysis of water quality was performed using an enhanced version of the Seasonal Kendall Parameter Test to identify seasonal trends in the mainstream of the Yellow River and in the Fen River. The Kendall Test was applied in three ways.

1. Trend of pollutant concentration: this shows variation in trend of pollutant concentration of the section over the period of analysis.
2. Trend of pollutant flux (load): trend of pollutants' transportation ratio shows increase and decrease of pollutant fluxes in the section.
3. Trend of pollutant concentration divided by discharge: this shows the water quality trend in comparison with discharge. If trend downwards, then the source is probably a point source insofar as point source discharges are normally uniform in time but are diluted with increasing discharge; if the trend is upwards, then source is likely to be a non-point source insofar as non-point sources are mobilized with runoff.

2.7.2.1. Trend Analysis of Water Quality for the Mainstream of the Yellow River

1. Stations used in trend analysis
   Lanzhou, Tongguan and Huayuankou respectively represent upstream, middle stream and downstream of the Yellow River. Lanzhou lies in the upstream of the Yellow River and its water quality is comparatively better. Tongguan lies in the provincial boundary of Shannxi, Shanxi and Henan. Industry is comparatively developed there. Tongguan is the most serious polluted mainstream of the Yellow River. Water quality of Tongguan is worse than Grade III all the year. Huayuankou is the most representative section in the downstream component of the Yellow River. There are few pollutants discharged to the Yellow River below Huayaunkou.
2. Period of data: there are seven year's (from 1995 to 2001) data for water quality and discharge.

3. Parameter choice: main representative pollutants selected were Permanganate Index, Biological Oxygen Demand (BOD5), Ammonia Nitrogen and Volatile Phenols. And flux.
4. Trend Analysis of water quality for mainstream of the Yellow River
   Data for COD_{Mn}, BOD, NH4-N, phenols, and runoff of 7 years in Lanzhou, Tongguan, Huayuankou, were used in the Kendall test. Trends in the Lanzhou, Tongguan, and Huayuankou sections in the mainstream of the Yellow River are noted Table 5.

Table 5: Water quality trend of trunk of the Yellow River

Section Name		Lanzhou	Tongguan	Huayuankou
Concentration	COD_{Mn}	↑	↑	↓
	BOD	○	↑	○
	NH_4-N	↓	○	○
Flux (load)	COD_{Mn}	○	○	↓
	BOD	↓	○	○
	NH_4-N	↓	○	○
Concentration divided by discharge	COD_{Mn}	↑	↑	↓
	BOD	○	↓	↓
	NH_4-N	↓	○	○

Note： ↑ trend up ↓ trend down ○ no trend

According to Table 5, the Permanganate Index (COD) of Lanzhou section in mainstream of the Yellow River kept an upwards trend; transportation ratio had no trend; pollutants' concentration adjusted by runoff had an upwards trend. This suggests that concentration of Permanganate Index was increasing and polluting sources were mainly non-point sources. Concentration of BOD and its concentration adjusted by water runoff had no trend; transportation ratio decreased slightly. Concentration, transportation ratio and concentration adjusted by runoff of Ammonia Nitrogen was downwards. Downtrend of concentration adjusted by runoff reflect for Ammonia Nitrogen reflects point pollution. In recent years, control and treatment of point pollution sources in Lanzhou played some role in the decrease of Ammonia Nitrogen.

Permanganate Index and BOD concentration of Tongguan section kept an upwards trend. Ammonia Nitrogen had no trend. BOD concentration adjusted by water runoff was decreasing. So, pollution of BOD maybe comes from point polluting sources. Water quality of Tongguan section was continuously poor. Permanganate Index and BOD concentration of Tongguan section kept an upwards trend. It is concluded that measures must be taken to control water pollution.

Permanganate Index concentration, pollutants' transportation ratio and concentration adjusted by water runoff of Huayuanlkou section had a downwards trend. Ammonia Nitrogen had no trend. Concentration and pollutants' transportation ratio of BOD also had no trend. Concentration adjusted by water runoff of BOD was decreasing. In recent years, control and treatment of point pollution sources in the Huayuankou section played some role in improving water pollution.

2.7.2.2. Trend Analysis of Water Quality in the Fen River

1. Stations used for trend analysis
   Five water quality monitoring stations in the upstream of the Fen River were chosen. They were Dongzhai, Ninghuabao, Jingle, Hecha, and Fen Reservoir. The middle and downstream of the Fen River below Taiyuan often dries up and the water quality is known to be very poor, therefore, the five station sections are in the upstream portion of the Fen River.
2. Period of data
   The period of data in upstream of Fen River was from 1990.3 to 2002.6 (12 years). The period of data of Wanjiazhai reservoir was from 1997 to 2002.6.
3. Parameters: main representative pollutants selected were Permanganate Index, Biological Oxygen Demand (5 Days), Ammonia Nitrogen and Volatile Phenols.
4. Results of trend analysis.
   Data for COD_{Mn}, BOD, NH_4-N, phenols, and runoff of 12 years in Dongzhai, Ninghuabao, Qingluo, Hecha, Fen Reservoir and Wanjiazhai Reservoir were used. Table 6 shows the trend of pollutant concentrations, pollutant transportation ratios, and pollutant concentrations adjusted by water runoff at the six stations.

Table 6: Result of trend analysis in upstream portion of the Fenhe River

Section Name		Dongzhai	Ninhuapu	Qingluo	Hecha	Fenhe Reservoir	Wanjia-zhai
Concentration	COD_{Mn}	↑	↑	↑	↑	↑	○
	BOD	○	↑	↑	○	↑	○
	NH_4-N	○	○	↓	↑	↑	○
	Phenols	○	○	○	○	○	○
Flux (Load)	COD_{Mn}	○	○	○	↑		
	BOD	○	○	○	○		
	NH_4-N	↓	○	↓	○		
	Phenols	↓	○	○	○		
Concentration divided by discharge	COD_{Mn}	↑	↑	○	↑		
	BOD	○	↑	○	○		
	NH_4-N	○	○	↓	↑		
	Phenols	↓	○	○	○		

Note: ↑ trend up ↓ trend down ○ no trend
Blank cells are reservoirs and measures of flux or discharge are not meaningful.

Trend analysis of pollutant concentrations

Permanganate Index of the five sections (Dongzhai, Ninghuabao, Jingle, Hecha, Fen Reservoir) became worse. Concentration of BOD in Ninghuabao, Jingle, Fen Reservoir was increasing, which had no trend in Dongzhai and Hecha section. Ammonia Nitrogen in Hecha and Fenhe Reservoir was increasing; Ammonia Nitrogen in Jingle kept downtrend; Ammonia Nitrogen in Dongzhai and Ninghuabao had no trend. Volatile Phenols in Dongzhai, Ninghuabao, Jingle, Hecha and Fen Reservoir had no trend.

Trend analysis of pollutant flux

As shown in Table 6 the transportation ratio of Permanganate Index in Hecha section was increasing, which was consistent with variant trend of concentration. Permanganate Index in Dongzhai, Ninghuabao had no trend. Transportation ratio of Biological Oxygen Demand in all sections has no trend. Ammonia Nitrogen in Dongzhai and Qingluo was decreasing; it had no trend in Ninghuabao and Hecha section. Transportation of Volatile Phenols in Dongzhai section increased. According to information reflected from pollutants' transportation ratio, total amount of polluting sources of Permanganate Index grew slightly.

Trend analysis of concentration adjusted by discharge

Concentration adjusted by discharge of the Permanganate Index at Dongzhai, Ninhuapu and Hecha increased. This increase suggests that this pollutant comes mainly from non-point sources upstream. BOD_5 increased at Ninghuabao but had no trend at Dongzhai, Jingle and Hecha. Ammonia Nitrogen increased at Hecha but decreased slightly at Jingle. Volatile Phenols decreased at Dongzhai but had no trend elsewhere indicating that this form of pollution comes from point sources.

The trends observed lead to some tentative conclusions. The decrease in Ammonia Nitrogen's concentration, transportation ratio and concentration adjusted by water runoff, at Qingluo suggests that pollution by Ammonia Nitrogen was caused by point sources. This is consistent with increasing control over point sources in recent years. In general the Permanganate Index of the upstream part of the Fen River increased however we believe this was mainly caused by reduced runoff over the period. Also, pollution of Permanganate Index was mainly caused by non-point polluting sources.

2.7.2.3. Trend Analysis of Water Quality in Wanjiazhai Reservoir

The Wanjiazhai Reservoir of the Yellow River was also chosen insofar as it is the source of water transfer from the Yellow River into the upper Fen He River.

Wanjiazhai Reservoir is large-scale hydraulic engineering structure for diverting Yellow River water to Shanxi Province. It was to be completed by the end of 2002. Table 6 contains the results of trend analysis for Wanjiazhai. Main pollutant concentrations, such as Permanganate Index, Biological Oxygen Demand (5 days), Ammonia Nitrogen and Volatile Phenols, had no trend indicating no change over the period.

However, according to observations on water quality, since conservation storage began in November 1998, water of the entire reservoir becomes black every May and June. As is shown by monitored result of water quality on June 2001, water quality of the reservoir was Grade V; inflow and outflow water of the reservoir was worse than Grade V. Main pollutants were Chemical Oxygen Demand, Nitrite Nitrogen, Petroleum, Total Phosphorous and so on. The reservoir does not meet the requirement of Grade III. If water pollution of Wanjiazhai is not solved quickly, it will negatively influence the water supply benefit of this construction and will pollute the Fen River reservoir.

2.8. Measures for Controlling Water Pollution in Transjurisdictional Areas

The following are requirements that are basic to the control of transjurisdictional water pollution:

- Enhance water environment monitoring.
- Further develop the Environmental Quality Standards for Surface Water.
- Develop scientifically-based water quality assessment methodologies.
- Pay greater attention to water environment protection in transjurisdictional areas in the Yellow River basin and, in particular, in the West China Development area.
- Enhance engineering measures for water pollution control.
- Implement total load control of water pollutants.
- Establish a unified basin management system for water resources.

2.9. Conclusions

Water environment monitoring of the Yellow River Basin is undertaken by two departments - SEPA and MWR. The two systems are independent from each other and form their own system. The Basin's Water Resources Protection Bureau is responsible for monitoring water quality at provincial borders.

A basin-wide network of water environment monitoring has been established with monitoring agencies at various levels and with laboratories having instruments for monitoring inorganic and organic pollutants. More than 100 parameters of several major categories like surface water, underground water, wastewater and sewage, water sources, and sediments are monitored, of which 36 parameters receive regular monitoring. An effective monitoring of water quality has been realized. Since 1993, the water environment monitoring labs in the whole basin have passed the State level metrological authentication one after another and monitoring work now has a legal basis in quality control. With the sound laboratory quality system, water quality data are reliable and comparable.

The statistical methodologies have been adopted to assess water environment quality of 2001 in the Yellow River Basin. First, water quality status has been investigated by monitored sections. The assessment result shows that 87.9% of the sections have water quality worse than Class III. The assessment result by river length shows that 31.7% of the total assessed length has a water quality better than Class III and the rest 68.3% has a water quality worse than Class III. On the whole pollution in the Yellow River water system is serious. Major pollutants are dissolved oxygen, permanganate index (COD), BOD_5, volatile phenols and petroleum types. Generally speaking, water quality of the upper reaches is better than that of the lower reaches and water quality of the main stream is better than that of the tributaries.

Water environment pollution at the provincial borders in the basin is very severe. Besides the background sections, most provincial border sections have been polluted to different degrees. Water bodies' functions for use have been degraded, especially the tributary sections. Most of then have lost their specified water functions; some have become foul ditches. In 2001, water environment quality of water bodies at provincial borders in the Basin generally deteriorated further, and sections whose water quality were worse than Class III increased to 75.9% from 2000's 70%. The provincial border sections of river main stream are mainly polluted by oxygen consuming organics. The tributary sections have also been polluted by toxic substances such as volatile phenols, in addition to oxygen consuming organics. Provincial border sections that are more polluted are mainly in the middle and lower reaches of the River, involving Shanxi, Shannxi, Henan and Shandong provinces. The Seasonal Kendall parameter test model has been adopted for respective analysis of water quality variation trend at Lanzhou, Tongguan and Huayuankou monitoring stations on the main stream, as well as the Upper Fen River. The calculated results show that the trend of pollutant concentration, and trends of pollutant flux and concentration/discharge ratio are all in consistent with the actual situations.

Pollution prevention and control of trans-jurisdictional water is complicated and requires large and systematic engineering. Proposals for prevention and control countermeasures and specific requirements should be based on a clear picture of the basin's water pollution sources, water environment quality status and water function zoning with a full consideration of the basin's social, economic and natural environment conditions. A water environment protection mechanism of level-by-level responsibility management with the basin and the region combined should be established, and total loading control for water pollutants should be implemented. The concept of the man-nature symbiosis and harmonious development should be adhered to. These will enable transjurisdictional water pollution to be controlled effectively and improved over time.

References

[1] China Environment Status Bulletin (2001), SEPA，2002.6
[2] 2001 Annual Report of Water Resource in the Yellow River, YRWBB, 2002.3
[3] Environment Monitoring Technical Standards, SEPA，1986
[4] Metrological Law of the Peoples' Republic of China, 1988
[5] Environmental Quality Standard of Surface Water (GB3838-88)
[6] R.M.Hirsch, et al. Techniques of Trend Analysis for Monthly Water Quality Data, Water Resources Research［J］, 1982, (8)
[7] Chen Binlu, et al. Trend analysis of water quality of Lingdingyang, Chongqing Environmental Science, Vol.24 No.2 P.69-72, 2002

3. TRANSJURISDICTIONAL WATER POLLUTION IN THE YELLOW RIVER BASIN

3.1. Introduction

With rapid economic development of various regions in China, transjurisdictional water pollution problems are becoming more and more noticeable. A number of transjurisdictional water pollution incidents with important transjurisdictional effects have already occurred. For example, the pollution accident of the Xiao Langdi Reservoir of the Yellow River, the pollution accident of Hongze Lake in Jiangsu Province caused by sewage discharged by Henan and Anhui Province and passing through the Huai River; the water pollution dispute between Dezhou of Shandong Province and Wuqiao of Hebei Province. Additionally, a large number of transjurisdictional water pollution disputes which have far-reaching social effects have also occurred between Jiangsu and Zhejiang Provinces, Zhejiang and Fujian Provinces, and Zhejiang and Anhui Provinces. Furthermore, within provinces, various transjurisdictional water pollution disputes are also frequent between municipalities, counties, towns and villages.

In the Yellow River Basin (YRB), serious water pollution accidents are not yet as frequent but do include the Xiao Langdi Reservoir accident. This situation is partly due to the comparatively low economic development level of much of the YRB. However, with continuous economic development of the Basin in recent years and official plans for extensive development in the upstream regions, there exists now a trend of aggravating transjurisdictional water pollution, which will also result in serious consequences if not dealt with properly.

The causes of transjurisdictional water pollution problems lie not only in continuous economic development which has worsened pollution, but also in the inadequacy of the legal framework for transjurisdictional water pollution management, inadequate enforcement of national and local legislation, an overwhelming protectionism exercised by local governments, lack of appropriate institutional mechanisms for comprehensive and integrated basin level management of water quantity and quality, as well as the lack of an integrated approach to monitoring and enforcement and in public participation.

3.2. Cooperative Mechanisms for EPBs for Transjurisdictional Water Pollution Management

In this TA we are requested to examine cooperative mechanisms amongst EPBs for dealing with transjurisdictional water pollution.

SEPA, provincial EPBs, prefecture level EPBs and county level EPBs create a "vertical" environmental management system in the field of water pollution management. They also play an important role in the resolution of transjurisdictional water pollution issues at different scales. Generally speaking, the "vertical" relations between these agencies at different levels are good. A similar relationship exists between the Minister of Water Resources and the various levels of Water Bureaus. The major difference is the role of the RBO whose link with SEPA is only via the WRPB that reports pollution levels at provincial borders to SEPA.

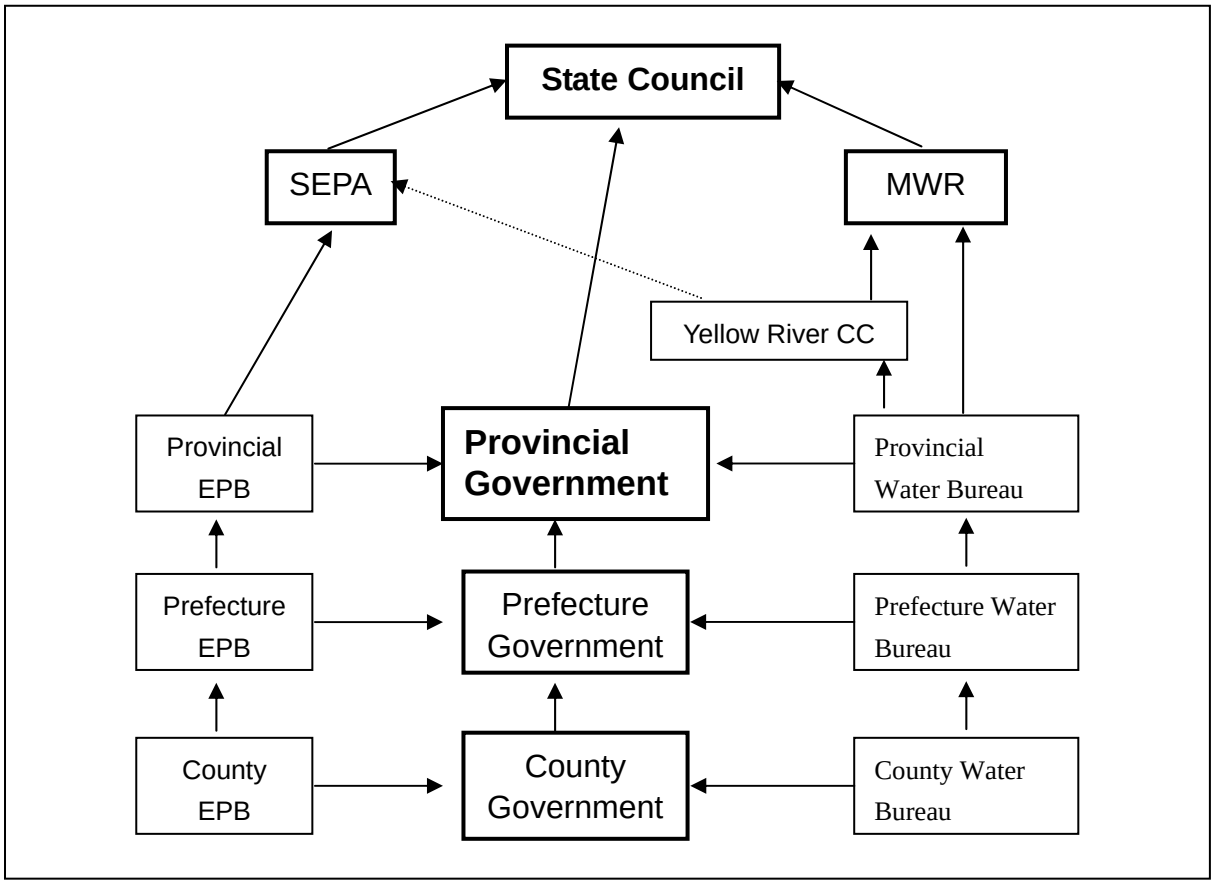


Figure 3.2: Reporting Relationships of EPBs and Water Bureaus at Various Levels of Government in the Yellow River Basin

The horizontal linkages between EPBs and their respective levels of government are equally important in the practical management of water pollution. Local government appoints EPB officials and, together with pollution levies, provides most of their budget. Local governments have, therefore, a strong and sometimes negative influence over EPB operational activities.

In the current Implementation Rules of WPPC Law there are generally, but not detailed, stipulations dealing with cooperative mechanism among EPBs. For pollution reporting, for example, Article 19 of the Implementation Rules of WPPC Law says, "After receiving the preliminary report on water pollution incident (accident), EPBs should report to the people's government in the area and the EPBs at the upper level immediately".

Similarly, there are general, but not detailed references to administrative orders for administrative responsibilities of EPBs. In a governmental document qualifying the responsibilities of Shanxi EPB, we can see stipulations such as: "Shanxi EPB is responsible for the investigation and resolution of pollution dispute between Shanxi and adjacent provinces". In the governmental document for the responsibilities of the EPB of Dating City in Shanxi Province, we can see stipulations such as, "the EPB shall direct and help in solving the significant trans-county and trans-basin environmental issues, and playing a negotiation role in dealing with environmental pollution dispute between counties".

In general, within a province, the "vertical" relationships between agencies at different levels are good – in part because of mutual reporting of all local EPBs upwards to the Provincial EPB. Also horizontal linkages between local EPBs within a province are good and can be used to resolve local disputes. Nevertheless, our evidence suggests that many intra-provincial transjurisdictional disputes, for example, between counties are not resolved. We believe this is due to the lack of a mechanism in current dispute settlement provisions of the WPPC Law that will ensure closure in the dispute.

In contrast, horizontal linkages between EPBs at all levels for inter-provincial transjurisdictional water pollution is poor except in cases where specific agreements have been reached between adjacent provinces (which is the exception and not the rule). When a trans-boundary pollution dispute occurs, due to protectionism of local governments, it is very difficult to reach an agreement. It is important to note that these transjurisdictional problems are not created by EPBs, but by local governments. Therefore, although it is essential to create a comprehensive mechanism for resolving transjurisdictional water pollution issues in which local governments have accountability for the actions of polluters and of the EPBs under their jurisdiction. It is not necessary, therefore, to create a comprehensive and unified cooperative mechanism among EPBs. Cooperative mechanisms among EPBs can be reflected in a variety of mechanisms such as dispute resolution mechanisms, information reporting mechanisms, etc. For example:

- When a transjurisdictional water pollution incident is found by an EPB, it should be required to be reported to the upper level EPB and the EPBs in adjacent areas immediately;
- Environmental monitoring and other information should be shared by EPBs in different administrative areas;
- EPBs from different administrative areas in the Basin should be actively involved in preparing river basin pollution control plans;
- Consultation with adjacent EPBs should be compulsory when developing local water environmental plans by an EPB.

In the recommendations made in this report, we have developed reporting and dispute resolution requirements that, if implemented, would enhance the role of EPBs in enforcing the law, and make local governments accountable for the actions of polluters under their jurisdiction.

3.3. Overview of Transjurisdictional Water Pollution of China

In a large country like China with many large rivers and lakes, rivers passing through different administrative areas are ubiquitous. Before China's economic reform and opening to the outside world, water pollution of rivers was not as serious as present, and therefore there were only a few transjurisdictional water disputes, which mainly focused on the aspect of water quantity. In recent years with rapid economic development, water pollution is becoming more and more aggravated and water pollution incidents are increasing daily. On the one hand, the management of pollution sources is not yet complete and in some cases not effective with excess waste discharge from enterprises and a large amount of untreated sewage discharged into water courses; on the other hand, there is a lack of efficient measures in legislation and in law enforcement, and in administrative coordination for resolution of disputes after these have occurred.

In eastern China where the economy is comparatively more developed, transjurisdictional water pollution issues are not only more severe but are larger in number. The following two recent examples, although not from the Yellow River, highlight the types of administrative and management actions that are precipitated by serious cases of transjurisdictional water pollution. The resolutions of the two accidents were quite different - one through administrative coordination and the other through judicial action.

a) The Case of Administrative Resolution of the Blocking Dam Dispute in the Transprovincial River Section between Jiangsu and Zhejiang Provinces

Shengze County of Suzhou City of Jiangsu Province adjoins Jiaxing City of Zhejiang Province. The Ma Xigang is the boundary river. Since the 1990s, Shengze County has witnessed rapid development of printing and dyeing industries, with a noticeable increase in water pollution. There would have been a fatal disaster to the downstream areas if the sewage discharged from these industries had gone into watercourses without being treated by advanced equipment with sufficient treatment capacity.

Nevertheless, the Ma Xigang River transports sewage to Jiaxing City. For many years sewage from upstream areas has been a major issue for local citizens. Local aquaculture and domestic drinking water supply have been affected by the sewage. Early in 1993, a large fish kill was caused by upstream sewage. In the almost ten years since that accident the local citizens have tried various means to call attention to the need to control this kind of pollution, however without much effect. According to recent years' monitoring results from the Tai Hu Basin Management Bureau on the water quality at the transboundary water section between the Jiangsu and Zhejiang Province, the water quality of the upstream part of the Ma Xigang River varies between Class 4 and Class 5 (worst class of water quality) for most of the year.

This transprovincial dispute has had a long history. On May 14, 2001, SEPA held a special coordinating meeting to deal with this issue and formulated a set of decisions, which was sent to the two provincial governments for implementation. It was specifically required that the Jiangsu Province should keep the transprovincial outgoing water quality up to standard, and the Suzhou City should compensate 1 million RMB to the Jiaxing City for damages.

Six months later, and with no resolution of the pollution issue, in the early morning of November 22, 2001, the residents of the Jiaxing City built a dam with sunken ships and blocked the transprovincial river course of the Ma Xigang River. Although relevant agencies had tried to coordinate, prevent and mediate, the citizens managed to block the river courses completely. This is in serious violation of the Water Law, the Flood Prevention Law and the Regulations concerning River Channel Management. These public actions brought an immediate response both from Leaders of the State Council and from senior levels of the MWR and SEPA, which went to Jaixing City for investigation and resolution of the incident.

In the afternoon of that day, on the basis of extensive hearings from the two provinces, the working group dispatched by the MWR cooperated closely with SEPA, and made four coordination proposals in consultation with the two provincial governments. On November 24, the leaders of the two provincial governments and the two ministries all signed a Coordination Agreement.

The Agreement specifically required that Jiangsu Province shall stop the operation of all the enterprises with excessive waste discharge and impose penalties in accordance with laws and regulations, and to take immediate actions to investigate and block all the other waste discharge outfalls which were still kept secret at that time. Zhejiang Province shall immediately organize to remove the dam to restore the river channel to its original condition.

However, as it was anticipated that it would take some considerable time to bring the existing pollution under control, and as compensation had not been made yet to the residents at that time, the residents refused to comply with the Agreement as they were afraid that once the dam was removed, the obligations of the upstream jurisdiction would not be implemented and the pollution would continue. MWR, SEPA, and the Zhejiang Provincial government then made efforts to consult with local residents and persuaded them to remove the dam. On December 14, the basic part of the dam was removed and the river channel resumed navigation.

Immediately after the coordination meeting, a special Committee for Comprehensive Water Environment Management of the Area of Wujiang and Shengze was established in Suzhou City. Actions taken include measures for pollution control. For example, the major printing and dyeing enterprises started to take turns in production or be limited in production, and the enterprises with excessive waste discharge were closed temporarily. Presently, measures for long-term water pollution control are being developed. The seven sewage treatment plants are now all in full operation except for two that have either been stopped or will be stopped.

On January 11, 2002, the TaiHu Water Environment Monitoring Center conducted an investigation once again into the pollution situation of the river network of this area, and found that the outgoing water quality of the Shengze River was up to the national standard for water of Class 3 and Class 4. Currently, the Taihu Basin Management Bureau has finished drafting the "Plan for Water Resources Protection of the Taihu Basin" and is preparing for submission of the Plan to relevant departments at a higher level for review. It is also organizing to develop a comprehensive plan for the water resources of the whole basin to address transprovincial water disputes and the prevention and coordination mechanisms. Meanwhile, it is going to enhance the management on basin water function zones, carry out research on transboundary assimilation capacity and waste discharge loads to further the unified management of the water resources of the whole basin.

On April 11, 2002, the Director-General of SEPA, Mr. Xie Zhenhua, presided over a meeting concerning the water pollution at the transprovincial area of Jiangsu and Zhejiang Province. He requested the two provinces to establish a united conference system to conduct mutual inspection and supervision on pollution prevention and water management for common development.

This example highlights some important administrative and legal aspects of transjurisdictional water pollution management. Local authorities did not act upon the illegal levels of waste discharge in the upstream jurisdiction and the laws were not enforced until a navigation and flood management threat was created by local citizens. This example also shows that local levels of SEPA often are not able, due to local pressures, to effectively implement and enforce the national pollution law. As we show elsewhere in this TA project, local EPBs are highly susceptible to pressure from protectionist local governments through existing administrative and budgetary mechanisms and is one of the causes of transjurisdictional water pollution disputes and results in failures in resolving these disputes. As a result, it requires senior level interventions to force a dispute settlement, a phenomenon which is increasing in China and for which an improved legal and administrative framework is required.

b) A Case of Transboundry Pollution Dispute with Judicial Resolution at the Boundary of Zhejiang and Anhui Province

The aquaculture contractors in the Si-an Reservoir of the Changxing County of Zhejiang Province had a dispute with an organic synthesizing chemical plant in Guangde County of Anhui Province, due to water pollution at the transprovincial section between Zhejiang and Anhui Province. The Si-an Reservoir is located in the area between Changxing County of Zhejiang Province and Guangde County of Anhui Province. Administratively, the reservoir belongs to Changxing county, however, 90% of its catchment area is in Guangde County.

In 2001, the farmers of the Si-an County found the reservoir polluted and reported to the EPB of the Changxing County, which immediately conducted a test on the sample water of the Si-an Reservoir in the afternoon, and found that the contents of sulphur and aniline (a highly toxic organic compound) in the water body had exceeded standards. A search for the pollution source found that the chemical plant was the major cause of the pollution.

From May 1 of 2001 the fish in the reservoir began to die in large numbers. According to statistics provided by relevant agencies later, direct losses of the contractors of the reservoir aquaculture amount to 617,500 RMB, while the losses to national fish resources was 574,500 RMB. This is was the second time that the Si-an Reservoir suffered from the upstream pollution from the same chemical plant. In the middle part of July 1997, more than 3000 acres of the reservoir were polluted and resulted in losses to fish-aquaculture contractors in the amount of over 250,000 RMB.

At the time of the second occurrence, the relevant agencies of the Changxing County were still engaged in safeguarding its rights for the first pollution. The People's Court of the Changxing County applied to the People's Court of the Guangde County for enforcement of the judgment concerning the compensation of the chemical plant in the Guangde County for causing pollution in 1997.

A people's representative of the Zhejiang Provincial People's Congress together with another 14 representatives, submitted a bill to the Third Session of the Ninth Meeting of the Zhejiang Provincial People's Congress, requesting the Zhejiang Provincial EPB to coordinate in the resolution of the Si-an Reservoir Pollution Accident as soon as possible. According to their opinion, protectionism exercised by local governments was the major reason for the long delay in resolution of this transjurisdictional pollution problem.

In the early part of September 2000, SEPA decided that the chemical plant must stop operations and suggested it be moved to some other place. The party concerned in Anhui Province was required to carry out the decision before September 30, 2000 and report its implementation to SEPA before October 1. However, until May of last year, the chemical plant had not moved and, indeed, was still in operation.

In accordance with the investigation made by the authorized agent of the plaintiff, the defendant has been making great contributions to the tax collection of the Guangde County. Under current environment protection institution systems, the Zhejiang Provincial EPB is not authorized to conduct management upon the enterprises in the Anhui Province, let alone supervision. After the occurrence of the accident, the Guangde County EPB still refused to cooperate with its counterpart in the Zhejiang Province on conducting water sampling under the excuse of jurisdiction.

On March 22, 2002, the case was heard in the People's Court of The Changxing County, Zhejiang Province. The plaintiff, the fishery contractors of The Sian Reservoir of Changxing County, claimed compensation from the Chemical plant of Guangde County of Anhui Province. The court issued a judgment as follows: The defendant shall compensate the plaintiff for its economic losses of 617,500 RMB and make the payment for it within ten days after the effective date of the judgment. The defendant shall bear the suit costs of 11,185 RMB.

This example again shows that local and provincial EPBs are subject to local pressures and, as a result, may not enforce the law nor carry out studies that are not in the interest of local authorities. The case also demonstrates how administrative decisions of SEPA are often ignored at the local level. While most transjurisdictional disputes are finally resolved through administrative mechanisms, the role of the courts is important in this example as it demonstrates how, in the failure of enforcing the law by local authorities, the courts can be used to impose a solution. In this case, if local authorities enforced the pollution law, there would be no need to revert to the courts except perhaps for issues of compensation. Clearly, use of the courts as a routine mechanism to ensure transjurisdictional compliance with the law is not efficient and suggests that the solution to most transjurisdictional issues should lie in an impartial administration of the law by local authorities and by implementation of administrative decisions by SEPA or of decisions made collectively by the transjurisdictional authorities.

3.4. Transjurisdictional Water Pollution In The Yellow River Basin

Many of the nine provinces of the Yellow River Basin are economically depressed areas, but have witnessed rapid development in the last twenty years. This has brought about more and more noticeable transjurisdictional water pollution problems. A large amount of untreated industrial and domestic sewage from the whole basin is discharged into mainstream and tributary rivers and has resulted in the water quality of many river sections of the mainstream and tributaries to be below minimum standards to a serious extent. Some serious pollution incidents, including the Xiao Langdi Reservoir incident of 1999, have occurred between Ningxia and Inner Mongolia Province, Inner Mongolia and Shanxi Province, Henan and Shandong Province, and among Shanxi, Shannxi and Henan Provinces.

The typical climate of the Yellow River Basin is semi-arid. Natural flows of the Yellow River are much smaller than in southern rivers, however seasonal differences are larger. Additionally, with a large number of water diversion projects, the basin-wide scarcity of water quantity sometimes leads to dry river sections in the lower reaches. The lack of flow volume is a major factor in water pollution of the Yellow River Basin.

With regard to management and legislation, the Yellow River Basin is similar to other areas of China. However, due to the lack of clear, non-arbitrary, and effective legislative and administrative procedures for resolution of transjurisdictional water pollution problems, the situation will only get worse. Furthermore, the lack of well-defined procedures for environment protection departments and water resource departments at basin and local levels, for dealing with transjurisdictional water pollution incidents, leads to administrative inefficiency. Consequently, transjurisdictional disputes are usually unresolved for long periods of time.

Case 1: The Water Pollution Disputes, Shanxi Provinces

Using Shanxi Province as an example - it has water pollution disputes with its neighbouring provinces of Inner Mongolia, Henan and Hebei. The Xiao Langdi Reservoir pollution accident of 1999 was caused by an unknown source, thought to be from either the Fenhe River of Shanxi Province, or the Weihe River of Shaanxi Province. Another example is the Wan Jiazai Water Conservancy Project in Shanxi Province in which water is diverted from the Wan Jiazai Reservoir on the Yellow River into the upper reaches of the Fenhe River. This project is vitally important for water supply to cities such as Taiyuan, and depends upon good water quality in Wan Jiazai Reservoir. However, during recent years, large pollutant loadings from a variety of sources in the upstream areas of Inner Mongolia (such as the coal fields of the Zhun Ger, Baotou and Huhe Haote, and large agricultural return flows to the main reach of the Yellow River) aggravate the situation and may threaten the entire project and cause large economic losses from the initial investment in the Project.

The Shanxi Provincial EPB has reported the present situation to SEPA, which has issued notices demanding better cooperation between Shanxi and Inner Mongolia for resolution of the problem. As this is a new water project, it is not known at this time if recent SEPA notices will have the desired effect and lead to an effective solution. This example demonstrates the large, but hidden, economic and social costs of transjurisdictional pollution that will be incurred if the responsible authorities do not take immediate and effective action against it.

Case 2: The Water Pollution in the Jindi River between Henan and Shandong Provinces

The Jindi River was originally a tributary of the lower reach of the Yellow River. Originating in Xinxiang County of Henan Province, it flows through Puyang and other locations in Henan Province, through Zixian and Yanggu Counties of Shandong Province, and becomes the boundary between Shandong and Henan Provinces. Its total length is 158 kilometres, while its length in Shandong Province is 83.4 kilometres. Although connected with the Yellow River, the water of the Jindi River can no longer flow into the Yellow River whose riverbed is now higher due to bed accretion. The Jindi River now flows into the Tuhai River and the Majia River through seven water sluices in Liaocheng City. The water in the Jindi River used to be so clear as to be transparent, and has benefited more than a million people in Shandong and Henan Provinces as one of the major sources for irrigation.

Since the 1980s, with rapid economic development, a large number of enterprises in Henan Province have been discharging excessive pollutants with high concentrations directly into the Jindi River causing severe pollution to the extent that no fish can now survive. Major pollution sources include industrial and domestic sewage from the Taiqian County Paper Plant, some other small-scale paper factories in the Pucheng, Xinxiang and Huaxian County, the Central China Alcohol Project, the Fanxian County Oil Refinery, and the No 2 Oil Extracting Factory of the Central China Oil Refinery General Factory. In accordance with monitoring results of 2001, the annual average content of COD of the Jindi River in Zhangqiu of Yanggu County was as high as 518 milligrams per litre, which exceeds the national standard for Class 5 Surface Water by 11.9 times. In January 2002, the concentration of COD rose to 2142 milligrams per litre. The pollution of the river is likely to worsen rather than improve so that, in general, the water now has no beneficial use. The sewage from upstream areas has not only caused severe economic losses to industry and agriculture in the middle and lower reaches, especially to Zixian and Yanggu Counties of Shandong Province. This pollution also threatens groundwater to some extent. In the middle part of January 2001, the sewage of the Jindi River overwhelmed 70,000 acres of fields in the Yanggu County, which caused direct economic losses of more than 10 million RMB.

This is typical of transjurisdictional pollution disputes that are a constant and continuing problem nowadays. At present the water pollution problem of the Jindi River has not been effectively resolved. For better cooperation and more active pollution control measures from the two provinces concerned some experts have made the following recommendations:

1. Control extant pollution sources to ensure enterprises' waste discharge is in line with standards; close and eliminate the enterprises with severe pollution and waste of resources and energy, including small scale paper and chemical plants; pollution prevention equipment installed in large and medium sized waste discharging enterprises shall be improved further to ensure their smooth operation for standardized waste discharge; those enterprises, which discharge excessive waste without operation of pollution prevention equipment shall be ordered to control pollution, or be closed or limited in production within a specified period to reduce waste discharge;
2. Strictly comply with regulations concerning environmental management of construction projects to guard against creation of new pollution sources; all new construction projects should be assessed on the aspect of environment impact to stop any new projects with projected pollution; more efforts shall be made to enhance supervision;
3. Large-scaled sewage treatment plants for comprehensive control shall be built as soon as possible.

Case 3: Water Pollution of Qingzhang River between Shanxi and Hebei Provinces

The Qingzhang River originates from the Taihang Mountain Area in Shanxi Province, and then runs into the Hebei and Henan Provinces. A large amount of waste discharged into the river from oil, iron and coal industries in the upstream areas has severely polluted the river. This has affected the downstream use of water for domestic and agricultural purposes, and therefore becomes grounds for pollution disputes.

In July and August of 2001, the continuous rainfall in Licheng, Zuoquan and Heshun counties of Shanxi Province broached several mine tailings dams allowing tailings to enter the Qingzhang River. These flowed downstream together with domestic sewage and other pollutant substances that had accumulated in the dry season, and finally resulted in severe degradation of water quality and a threat to the Yuecheng Reservoir which is the drinking water source for two cities in the Anyang of Henan Province.

After the occurrence of this situation, Hebei Provincial EPB immediately reported to the Shanxi Provincial EPB, which ordered the two municipal EPBs in Changzhi and Jinzhong Cities to investigate into and deal with the incident. The vice director-general of the Shanxi Provincial EPB led a special committee to the Heshun, Zuoquan and Changzhi Counties of Shanxi Province and Shexian and Cixian Counties of Hebei Province to conduct investigations. The Changzhi Municipal EPB imposed a punishment on the illegally discharging enterprises; the Jinzhong Municipal EPB called for a special meeting for proper measures and arrangements concerning the incident; and the governments of Licheng and Zuoquan County closed the small mines that had resumed production after having been closed before, and restored, enhanced or rebuilt the tailings containment dams. Once this was done, the pollution was controlled quickly, the water quality improved gradually, and the threat of possible pollution to the Yuecheng Reservoir was eliminated. Also, a potential transjurisdictional pollution dispute was avoided. When the staff from Handan and Anyang municipal EPBs paid a visit to the Changzhi and Jinzhong City of Shanxi Province in the middle part of August, they expressed their satisfaction on the pollution control measures taken by the Shanxi Province as well as on the improvement of water quality of the Qingzhang River.

To prevent pollution from pollution sources, the various cities and counties in the Qingzhang River Basin are actively engaged in applying to the State for funds to build a sewage treatment plant for further control of pollution.

Since the three provinces of the Shanxi, Hebei and Henan have enhanced communication in regard to the pollution of the Qingzhang River Basin and have undertaken unified pollution prevention, no serious transjurisdictional water pollution incidents have occurred in the upstream. middle stream and downstream areas of the Qingzhang River Basin to date.

The important lesson in this example is that enforcement of the law, good communication, and joint commitment by the transjurisdictional parties is an effective institutional mechanism for dispute avoidance and/or settlement. This works without recourse to judicial measures and without intervention by higher authorities. Local agencies are in control of the dispute settlement mechanisms and can ensure that the settlement is equitable and acceptable to all the parties. Such an arrangement can be at an informal level amongst the parties, or can be the basis of a formal Agreement with, or without, a formal disputes settlement mechanism.

3.5. Major Problems Of Transjurisdictional Water Pollution and Their Causes

3.5.1. Major Characteristics of Transjurisdictional Water Pollution

Transjurisdictional water pollution problems have occurred in most of the Yellow River Basin, and the most serious ones exist in the middle and downstream areas. Briefly, the major characteristics of transjurisdictional water pollution in the Yellow River Basin are as follows:

a) With rapid economic development, pollution sources and waste discharge are all continuously increasing. The annual waste discharge load in the Yellow River Basin in the early Eighties was 2.17 billion m^3, and increased to 4.44 billion m^3 in 2000. The discharge of pollutants into both the mainstream and tributaries has created a serious threat to the water environment of many river sections.

b) Compared with the eastern part of China where the overall development level is relatively high, polluting industries in the Yellow River Basin have developed more recently. This is especially the case for township and rural enterprises where production technology is less advanced and pollution control technology largely non-existent, creating enormous pollution problems. Furthermore, many polluting enterprises that were originally located in East China have been moved to the Yellow River Basin for continuation of production.

c) For various reasons, including lack of funds, the treatment rate of industrial and domestic sewage is low, with a large amount of untreated sewage discharged directly into rivers.

d) There is no legal requirement or incentive for local jurisdictions to take responsibility for downstream pollution due to their pollution control decisions. This is exacerbated by local economic protectionism of public officials that often results in failure to strictly enforce the laws and regulations. Nevertheless, there still exist some cases of successful resolution achieved through inter-regional coordination and negotiation, such as some transjurisdictional pollution disputes between Shanxi and Hebei Provinces, which were resolved through efficient negotiation and cooperation between the EPBs of the two provinces.

e) The water pollution of tributaries is as severe as that of mainstreams in the Yellow River Basin, and sometimes even more severe as, for example, in the Wei and Fen Rivers The Fen River has actually become a sewage channel to a large extent within the boundary of Shanxi Province.

f) The downstream areas are disadvantaged both in water quality and water quantity. Due to natural phenomena and the influence of human activities, the water quantity in the mainstream and tributaries of the Yellow River is rapidly decreasing, with concomitant decreases in the dilution and assimilation capacities of these water bodies. All these elements have jointly aggravated water pollution.

g) Transjurisdictional water pollution conflicts in the middle and downstream areas are relatively tense. It is especially the case between Inner Mongolia and Ningxia Province, Inner Mongolia and Shanxi Province, Henan and Shannxi Province, and among Shanxi, Shandong and Henan Provinces. Now we have the curious situation where a province that is damaged by upstream pollution is also polluting the provinces that are further downstream. In Shanxi Province for example, the Wan Jiazhai water diversion project in Shanxi Province is polluted by upstream sources in Inner Mongolia. Nevertheless, the Fen

River receives a large amount of sewage in Shanxi Province and empties into the mainstream of the Yellow River and thus pollutes Henan Province downstream.

h) In addition to those transjurisdictional pollution issues, which are inter-provincial, there are many other transboundary disputes between cities and counties within individual provinces of the Yellow River Basin.

3.5.2. Causes of Transjurisdictional Water Pollution

There are many causes for transjurisdictional water pollution problems although the underlying reason is the rapid economic development of various regions within the Basin. Currently the economic development model in China includes excessive exploitation of natural resources. In a large number of areas, due to poor technology, shortage of funds, and insufficient attention to resource and environment protection, pollution problems are becoming daily more noticeable.

With regard to legislation, the current legal framework concerning transjurisdictional water pollution is incomplete, suffers from lack of clarity and is not sufficiently prescriptive, in regard to:

- Specific measures for transjurisdictional water pollution control and management.
- Lack of accountability of upstream jurisdictions for maintaining transjurisdictional water environment quality standards.
- No legal basis of defining a transjurisdictional pollution event except when damage can be demonstrated.
- Inadequate dispute resolution measures.
- Basin-wide planning and management: This is an essential component while this is identified as a factor in avoiding transjurisdictional frictions, however the Detailed Rules for Implementation (of the WPPC Law) (DRIL) of 2000 is not sufficiently explicit on mechanisms, procedures and authorities to carry this out, and the division of responsibilities between the environment and water departments is often conflicting.
- Failure of the legal framework to provide an adequate framework for integrated water quantity and quality management and control.
- Overlap of the two main legal instruments (WPPC and Water Laws) leads to overlap of many institutional responsibilities and to lack of clarity of duties and responsibilities of various parties concerned.
- The WPPC Law tends to contain statements of principle rather than of process and procedures. Consequently the law often gives relatively little direction to how a dispute should be settled. This is a significant problem in litigation when the law may be interpreted one way by one court and in another way by another court.

One of the root causes of transjurisdictional disputes does not lie in the legal framework but rather in the failure of local authorities to enforce the existing law and to implement administrative decisions. This is an institutional problem that has its origins in the excessive dependency of local EPBs on local governments for financing and in staffing decisions. This is in spite of much legislation concerning environmental protection, waste discharge of enterprises and the responsibilities of relevant administrative institutions which require effective implementation and enforcement. Some of these are noted below.

- With regard to government's responsibilities, the Environment Protection Law stipulates: various levels of local governments shall be responsible for the environment quality within their jurisdictions, and shall take measures to improve environmental quality; as for the polluting units, relevant governments shall order them to prevent pollution within a specified period; as for those that have not accomplished the tasks of pollution control within a specified period, the governments should order them to close. In accordance with the provisions of the Water Pollution Prevention and Control Law of the People's Republic of China, the State shall establish unified standards for transjurisdictional water quality of key rivers; local governments shall be responsible for the water environment quality within their jurisdictions and ensure the outgoing water quality to be in line with the target specified in the water pollution prevention and control plans of the basins.
- Laws have also determined the responsibilities of relevant departments in charge: EPBs have the authority to conduct on-the-spot inspection on the waste discharge units within their jurisdictions, and impose punishment on the violating units in accordance with laws and regulations; as for the units which keep using out-of-date polluting equipment or techniques which have been expressly forbidden by the State, comprehensive economic management departments of the local government where the unit is located shall report to the government for closing or stopping the operation of the units.
- The Standardization Law has also made clear the responsibilities of waste discharge units: the standards for waste discharge and environment quality are compulsory. The Environment Law states that waste discharge units should keep regular operation of pollution control equipment to ensure their waste discharge in line with standards. The Civil Code of the People's Republic of China also expressly stipulates that: neighbouring parties concerned shall properly deal with neighbouring relationship with regard to saving water, discharging water, having access to pass through and letting in air and sunshine, in accordance with the principle of facility to production and living, mutual help in unity, equality and reasonability.

According to these laws, it is reasonable to expect that, if local governments and responsible departments concerned carry out their duties and responsibilities for environmental supervision strictly in accordance with these laws and regulations, and if waste dischargers comply with environment laws and regulations, the potential for transjurisdictional pollution disputes will be greatly diminished.

However, local protectionism is a major cause for transjurisdictional water problems. As economic development is the major aim of various levels of governments, and the pollution-causing enterprises are usually major contributors to local taxes, the local governments therefore usually do not want to exercise strict environmental management measures on them. Even after occurrence of incidents that have caused pollution and losses to downstream jurisdictions, local governments are still reluctant to resolve the problems. The role of local governments in confirming senior staff positions in local EPBs is another negative factor in the ability of EBPs to enforce laws that are not in the interest of local officials.

The growing problem of water disputes and the failure to deal with many of them indicates that the dispute resolution mechanism provided in the WPPC Law is inadequate. In accordance with extant laws and regulations including the WPPC Law and the Environment Protection Law, transjurisdictional water pollution disputes shall be dealt with through negotiations among relevant local governments, or through coordination from a more senior level of the department to which the local agency reports. However, in practice, resolution through negotiation has been difficult to achieve. For example, Changxing County was caught in a dilemma after the occurrence of pollution in the Sian Reservoir. If it had waited a longer time for the participation of relevant departments from Guangde County in monitoring, the monitoring result might have been far from the actual situation at the time of the pollution incident, due to the assimilation capacity of the water body within one to two days. But if it had not waited for the participation of the Guangde County in monitoring, the monitoring result would have been less authoritative. Therefore, without intervention of an unbiased third party or some authority allowing the aggrieved party to conduct timely authoritative investigation, the evidence for a pollution incident will be deficient.

Another problem that cannot be ignored is the contrast between the division of jurisdiction and the continuity of water resources in space. Currently the management of water resources is conducted on the basis of administrative areas, while contrarily, water resources cannot be divided in space. With economic development, pollution caused by upstream areas and affecting downstream areas will surely occur again and again. Who is entitled to identify pollution sources? Whose monitoring result is more authoritative? Whose investigation result should be taken into account by courts? Obviously, comprehensive water resource management on a basin level should be an important way for resolving such problems.

Another factor that gives rise to transjurisdictional problems is the division of water quantity and quality, both administratively and legally. Modern water management requires the integrated management of quantity and quality due to the inseparable linkages between these. While a single law is neither necessary nor is it the norm in most western countries, the laws governing quality and quantity must reinforce each other and not create administrative competition between ministries as is now the case in China, especially for pollution monitoring and reporting. In western countries, the laws on quality and quantity are administered and enforced by all concerned ministries and not solely by the originating ministry. In Canada, for example, the Fisheries Act is one of the main legal instruments used by federal (state) and provincial fisheries, water, and environment agencies to combat pollution. In America the Clean Water Act, although initiated by the US-EPA, is enforced by all concerned state and federal agencies. Thus, a basin-wide management organization can impartially administer all the law without having to have a specific law that gives it administrative power. In this way, integrated water management can reduce the potential for transjurisdictional water disputes that arise from quantity decisions that do not include the quality dimension.

Other factors that exacerbate the transjurisdictional water disputes are the lack of transparency in the decision-making process for quantity/quality management, insufficient public participation and information disclosure, poor communication, and lack of involvement of stakeholders in basin or sub-basin organizations.

4. NATIONAL LEGISLATIVE FRAMEWORK FOR TRANSJURISDICTIONAL WATER RESOURCES AND POLLUTION MANAGEMENT[4]

4.1. The Emergence and Development of the Policies and Legislations concerning Transjurisdictional Water Environment Management of China

The management of transjurisdictional rivers, including water environment management, has always been a problem in China from time immemorial. The earliest management of transjurisdictional rivers mainly focused on flood control, with the famous case of water control by Dayu, who was a well-known ruler of ancient China. Later, with the development of productive forces and scientific technologies, utilization of water resources came into being, and hence brought about the management of dam construction for water storage, water diversion for irrigation, water conservancy for generating power, and water transport, etc. In contemporary ages with industrial development, the problems concerning transjurisdictional water pollution and management, as well as rational utilization of water resources began to emerge.

During the reign of Shun, a legendary monarch in Ancient China, there existed the environment protection institution called the Department of "YU", whose functions included management of rivers and ponds.[5] In the Western Zhou Dynasty (c, 11 century – 771 BC), the River Committee was established in the Department of "YU", whose staff members were identified in accordance with the sizes of rivers.[6] In order to develop agriculture and alleviate the problem of water shortage, Mr. ZHAO Xinchen, the Viceroy of Nanyang County of the Western Han Dynasty (206 B.C.-A.D.24), developed local legislation concerning rational allocation of water resources, and engraved them on a stone tablet which was set up at the boundary of farmlands to prevent water use disputes.[7] In the Tang Dynasty (AD 618-907), the feudal rulers adopted severe criminal measures for water resource protection and water pollution control. The Tang Law provided that "those that have broken dikes shall be subject to one hundred strikes", "those that have discarded dirty substances out of the walls of their home shall be subject to sixty strikes; but those that have discharged water shall not be punished. The responsible administrators that have failed to punish this kind of acts shall be convicted of the same crime." In the Song Dynasty (A.D. 960-1279), it was expressly stipulated that irrigation shall be in the order of upstream areas prior to downstream areas, and paddy field prior to dry farmland. In case of breakage of water conservancy equipment, the

[4] The material in this chapter is mainly drawn from the report, "The Policy and Legislative Framework Concerning Water Environment in China" by WANG Canfa, and a supplementary report by WANG Canfa, prepared under this TA project.

[5] Chief editor YUAN Qinglin, Historical Narrative on China Environment Protection, China Environment Science Publishing House, March 1990, first edition, Page 152.

[6] See above, P 159

[7] Chief editor LUO Guihuan, Historical Draft on China Environment Protection, China Environment Science Publishing House, August 1995, first edition, Page 57

households for water use shall be held responsible for repair.[8] During the Reign of Yong Zheng of the Qing Dynasty (1644-1911), there existed a special basin level management institution, called "FU Zonghe", whose functions were to manage the waterways of Henan and Shandong. [9]During the KUO Mingdang's reign in the Mainland of China, the Yellow River Water Conservancy Committee was established, and *the Regulations of the KUO Mingdang Government concerning the Organization of the Yellow River Water Conservancy Committee* were promulgated. In the Yangtze River, the Yangtze River Waterway Management Committee and later a Yangtze River Water Conservancy Committee were established with the authority for basin level management.

4.2. Policies and Legislation concerning the Management of Transjurisdictional Water Environment after the Founding of the People's Republic of China

After the founding of the PRC in 1949 the policies of the state and Communist Party have played a central role in water environment management. Polices developed by the Party Central Committee and the State Council have a strong regulatory effect and are subject to coercive enforcement. It was only at the end of the 1970's that a difference emerged between policy and legislation.

4.2.1. Policies and Legislation Concerning Transjurisdictional Water Environment Management from 1949 to 1972

After the founding of the PRC in November 1949, the Central government established the Ministry of Water Resources (MWR). Shortly after that, the MWR decided to establish some transjurisdictional institutions including the Yellow River Water Conservancy Committee, the Yangtze River Water Conservancy Committee, the Huaihe River Water Conservancy Project Administration, etc, whose major functions and duties were flood control, navigation, transportation and water conservancy equipment construction, etc.

On November 25, 1961, the Party Central Committee approved *the Ten Recommendations concerning Enhancement on Water Conservancy Management*, drafted by the Ministry of Agriculture and the Ministry of Water Conservancy and Electric Power. The Recommendations provides that "*With regard to the water conservancy projects related to several ministries or likely to cause conflicts between upstream and downstream areas, the departments concerned shall negotiate with each other to develop the plans for their control and operation, the responsible agencies shall carry out these plans after the approval of higher level institutions, and the local Party Committee and governments at the places where the projects are located shall ensure the realization of these plans*."

---

[8] Chief editor LUO Guihuan, Historical Draft on China Environment Protection, China Environment Science Publishing House, August 1995, first edition, Page 71

[9] Chief Editor ZHANG Jinfan, General History of Bureaucracy of China, the People's University, October 1992 first edition, Page 655.

In summary, up to the early 1970s, policies and legislations concerning transjurisdictional water resource management of China mainly addressed the aspects of flood control, construction and protection of water conservancy equipments and prevention of water and soil erosion, and rarely dealt with transjurisdictional water pollution control, rational development and utilization of water resources and settlement of water disputes.

4.2.2. Policies and Legislations Concerning Transjurisdictional Water Resource Management from 1971 to 1988

In June 1972, the United Nations Conference on the Environment was held in Stockholm with more than 40 participants from China. The cases of environmental pollution introduced by the delegates from other countries shocked the Chinese delegates and led to a number of specific actions, including:

- 1972: Shortly after the UN Conference, the State Council approved the *Report of the State Planning Committee and the State Construction Committee concerning the Pollution of the Guang Ting Reservoir and Settlement Recommendations*, which required transjurisdictional water pollution control of the Guang Ting Reservoir parts of Hebei Province, Shanxi Province and Beijing City. A representative Leading Group for the Water Source Protection of the Guang Ting Reservoir was formed.
- 1973: the State Council approved the *Report of the State Planning Committee concerning the Conferences for National Environment Protection*, as well as the annex, *the Several Regulations concerning Protection and Improvement of Environment (trial draft).* According to them, *"Environment protection and management institutions on the basis of river basins shall be established for all the major rivers and lakes of the whole country. The management institutions for transjurisdictional water systems shall consist of the representatives of all the related areas, responsible for developing and implementing specific schemes for basin level pollution control in accordance with the above-mentioned standards, and supervising upon the riparian discharge of industrial and domestic sewage."*
- 1974: the State Planning Committee and the Ministry of Hydroelectricity submitted to the State Council the *Report concerning Enhancement on the Riparian Water System Management and Water Source Pollution Control*, recommending the establishment of the Leading Groups and Working Agencies for Protection of Major Rivers and Lakes.

  The Office of the Leading Group for Environment Protection under the State Council promulgated the *Major Points and Measures concerning Environment Protection Plans*, which requires that the water pollution of the major rivers and lakes, including the Bo Hai Sea, Yangtze River, Song Huajia River, Ya Lujiang River, Zhu Jiang River, Huai He River, Haihe River, Li Jiang River, Tai Hu Lake, Guang Ting Reservoir, Dian Chi Lake, etc, be ultimately controlled within three to five years and completely controlled within ten years. Management institutions were to be established for all the major river systems, and pollution control plans developed through joint efforts of relevant areas and departments and to be incorporated into the long term plans and annual plans of the relevant provinces, cities, prefectures and departments, organizing relevant industrial and mining enterprises to attain national waste discharge standards within three to five years. The water quality of

all the water systems shall attain national surface water quality standards within ten years and be restored to good conditions.

- 1975: the Ministry of Water Resource issued the *Notice concerning the Establishment of the Office for Water Source Protection of the Yellow River*, approved *the Report of the Water Conservancy Committee under the Hydroelectricity Ministry concerning the Establishment of the Office for Water Source Protection of the Yellow River, whose major task was to conduct investigations into the water pollution of the Yellow River*, develop water quality monitoring at hydrologic stations, and establish and improve water quality monitoring network of the water systems of the Yellow River with joint efforts of the relevant departments in the riparian provinces and regions in the Yellow River Basin.

  The Leading Group for Environment Protection under the State Council submitted to *the State Council the Report concerning the Pollution and Control Measures of the Huai He River*, which required the control of pollution of the Huai He River. The State Council approved and issued the Report.
- 1976: the Leading Group for Environment Protection under the State Council issued a document together with the Ministry of Hydroelectricity to approve the establishment of the Yangtze River Water Source Protection Bureau.
- 1978, the State Council responded to the letter of the Hei Longjiang Province concerning the Water Pollution Control of the Song Huajiang River, approving the establishment of the "Leading Group for the Protection of the Song Huajiang River", which was scheduled to have a subsidiary office with five to seven working staffs.
- From 1978, some areas have also developed local legislation on water system protection, including the *Regulations of the Hei Longjiang Provincial Revolutionary Committee concerning the Protection of the Song Huajiang River System (September 6, 1978), the Provisional Regulations of the Hunan Provincial Revolutionary Committee concerning the Protection of the Xiang Jiang River System (April 6, 1979), the Trial Regulations of the Kunming Provincial Revolutionary Committee concerning the Environment Protection of the Dianchi Water System (April 1, 1980),* etc. A series of measures for water system protection and pollution control were developed.
- 1981: the Ministry of Water Resources promulgated the *Provisional Measures concerning the Management of Irrigation Areas*, whose Article 4 provides: "with regard to the managerial mechanisms for the irrigation areas of the country, those whose impact scopes are limited to one county, one prefecture or one province shall be in the charge of the county, prefecture or province; those crossing two administrative areas shall be in the charge of the administrative unit of a higher level or the major beneficiary administrative unit authorized by it. The management of the irrigation areas of great importance may be subject to management institutions of a higher level."
- 1982: the State Council promulgated the *Regulations concerning Water and Soil Conservation*, whose purpose is for "control of rivers", and authorized the basin institutions of various rivers and lakes to be responsible for the water and soil conservation, survey, planning and scientific research within the boundaries of the basins, and assisting and promoting the water and soil conservation departments of the various

provinces, regions and municipalities within the boundaries of the basins in water and soil conservation.

- 1983, the Ministry of Water Conservancy and Electric Power promulgated the *Regulations concerning the Management of Water Conservancy and Hydroelectricity Projects*, whose Article 17 provides for the management of the water conservancy and hydroelectric projects at the boundaries, requiring that all the water conservancy and hydroelectric projects shall be managed strictly in accordance with the integrated plans of water conservancy and hydroelectricity, the agreements entered into by relevant parties after negotiation, as well as relevant resolutions ….. If disputes occur during the implementation of agreements, the two parties concerned shall carry forward the spirit of solidarity, consult each other initiatively, and report to a higher level authority for arbitration when necessary, but shall not change the agreements presumptuously.

  The Ministry of Urban & Rural Construction & Environment Protection issued a document together with the Ministry of Water Resources, deciding to carry out dual authority upon the water resource protection bureaus in the five basins of the Yangtze River, Yellow River, Huai He River, Zhu Jiang River and Hai He River, with the major responsibilities lying upon the Ministry of Water Resource.
- 1984: *the Water Pollution Prevention and Control Law of the PRC (the WPPC Law)* was adopted and promulgated.
- 1986: the Environment Protection Commission under the State Council promulgated the *Regulations concerning the Technologies of Water Pollution Control*, whose first major aspect concerned the comprehensive water pollution prevention and control on the basis of basins and regions.
- 1987: the Ministry of Water Resource and the State Environment Protection Administration (SEPA) held a united conference related to water resource protection of river basins in Luo Yang City of Henan Province; after the conference they issued the *Notice concerning Further Implementation of Dual Authority upon Basin Water Resource Protection Institutions*.

In summary, during this period policy was converted to legislation, and the nature of transjurisdictional water resources and water environment issues was clearly recognized as was the need to plan at the basin level, and the explicit recognition of upstream-downstream issues that could lead to conflicts. Leading groups were established, and the Water Resource Protection Bureaus established.

4.2.3. Policies and Legislation Concerning Transjurisdictional Water Environment Management after 1988

- 1988: the National People's Congress passed the *Water Law of the PRC*. Although its provisions related to water resource protection and management are not very complete, it was a landmark piece of legislation that identified the need for comprehensive water resource management, and contained a number of provisions concerning transjurisdictional water environment protection and management.

  The State Council promulgated *the Regulations concerning the Management of Waterways of the PRC*, whose provisions involved the management of transjurisdictional waterways.

- 1991, *the Water and Soil Conservation Law* was adopted and promulgated. It provided that " the transjurisdictional disputes related to soil erosion shall be settled through negotiation and consultation; those that have failed to be settled through negotiation and consultation shall be dealt with by the people's government of a higher level.

  The State Council promulgated *the Regulations concerning Flood Control of the PRC*, which has provisions for flood control of transjurisdictional rivers, including the flood control schemes of the Yangtze River, Yellow River, Huai He River and Hai He River as well as for other transjurisdictional rivers.

  The State Council promulgated *the Decision concerning Further Control of Huai He River and Tai Hu Lake*, which emphasized "the enhancement of the function of integrated management of basin level institutions. The major water conservancy projects within the Basins shall be subject to direct management and integrated allocation of basin level institutions."

- 1995: the State Council promulgated *the Provisional Regulations concerning the Water Pollution Control of the Huai He River Basin*, which focuses on transjurisdictional water pollution control.

- 1996: *the Decision of the State Council concerning the Several Issue of Environment Protection* requires that " Basin level water pollution control shall be enhanced. The Water bodies that have met waste discharge standards but still failed to attain national water environment quality standards shall be subject to the waste load control system the checking and verification system of major pollutants. Emphasis shall be put on the water pollution control of the Huai He River, Hai He River, Liao He River, Tai Hu Lake and Dian Chi Lake."

  On October 28, 1996, the State Council promulgated *the Policies concerning Water Conservancy Industries*, which include the policies related to transjurisdictional water resource protection. The detailed implementing rules were issued in 1999 by the MWR.

- 2001, the State Environment Protection Administration promulgated *the Trial Measures for Management of Waste Discharge Permit of Major Pollutants in the Huai He and Wei He River Basins*, which provides that the State shall conduct waste discharge permit systems for major water pollutants in the Waste Load Control Areas in the Huai He and Wei He River Basins. The discharge of major water pollutants shall not exceed national or

local water pollutant discharge standards and waste load control quote. Waste Discharge units must apply for permits for discharge of major water pollutants in accordance with regulations, and discharge water pollutants in accordance with the prescriptions of the permits. The waste discharge units without waste discharge permits shall be forbidden to discharge major water pollutants.

- 2002: The Water Law of the PRC was amended and which enhanced the regulations concerning transjurisdictional water resource management.

In summary, during this period the State began to develop systematic policies and legislation concerning transjurisdictional water environment management. Unfortunately, the legislation and policies tended to be piecemeal without overall consistency and coordination. The body of legislation does not, therefore, form a complete systematic approach to transjurisdictional water resources or water environment management.

4.3. The Basic Framework of the Policies concerning Transjurisdictional Water Environment Management of China

4.3.1. Overarching Principles

There are a number of over-arching principles that are the basis for policies on water resources management in China. These include:

- **State Ownership of Water Resources:** As a socialist country, the state ownership of natural resources is a principle stipulated in the Constitution of China. The state is entitled to make final decisions with regard to the development, utilization and allocation of water resources including transjurisdictional water resources.
- **Policies concerning Comprehensive Planning:** Planning is another policy concerning the development and utilization of water resources, and especially suits the development and utilization of transjurisdictional water resources. On March 3, 1964, It was stipulated *the Directive of the State Council concerning Enhancement on Management and Protection of Navigation Canals*, which requires that "various areas and departments shall make overall plans on the basis of considering the needs of various aspects including water transport, flood control, drainage, irrigation, power generating, water supply, aquaculture products, etc. to achieve comprehensive efficiency." The Water Law of the PRC, promulgated in January 1988, expressly legalized overall planning. It provides that "… development and utilization of water resources and prevention and control of water pollution shall be conducted on the basis of overall plan and consideration of various relevant elements to make comprehensive utilization of water resources and achieve efficiency." The revised Water Law promulgated on August 29, 2002 is a further embodiment of the policy of overall plan and consideration. In the revised Water Law, there is a chapter wholly addressing "water resource plan". "Overall plan and consideration" includes the overall plan and consideration of various function of water resources and the overall plan and consideration of different administrative areas including upstream and downstream areas. Therefore this policy is of central importance to transjurisdictional water environment management.

- **Policies concerning Planned and Economical Utilization of Water:** The water resource amount per capita of China is less than one-fourth of the average of the whole world, and the allocation in time and space is very uneven. As a whole, China suffers serious water shortages; therefore, planned and economical utilization of water becomes a centrally important policy for development and utilization of water resources in China.
- **Policies concerning Paid Utilization of Water Resources and Waste Discharge Fee Collection:** The policy concerning paid utilization of water resources was adopted by China in the 1980's, and was reflected in *the Water Law 1988*. The policy of waste discharge fee collection was adopted at the end of the 1970's. *The Law of Environment Protection of China (Trial) 1979* requires that all the waste discharge in excess of national standards should be subject to collection of waste discharge fees. In t*he Decision of the State Council concerning Enhancement on Environment Protection during the Adjustment of National Economy 1981,* the policy of waste discharge fee collection was reaffirmed and used as an economic lever. This policy was reflected in all the subsequent legislations on environment pollution control. Paid utilization of water resources can reduce waste of water resources; waste discharge fee collection can reduce water pollution to some extent and improve water quality. Both policies can facilitate rational development and utilization of water resources. Currently, paid utilization of water resources has developed into water rights trading among different areas, and waste discharge fee collection has been connected with the problem of compensation and payment of fees when upstream and downstream water quality fail to reach standards. Therefore, both paid utilization of water resources and waste discharge fee collection involve transjurisdictional water resource management.
- **Policies concerning Water Quantity Allocation and Waste Load Control:** The policy of water quantity allocation is closely related to the policy of planned utilization of water. Water resources need to be allocated and distributed in accordance with plans, and therefore we should first resolve the problem of water quantity allocation among different working units and areas. *The Water Law 1988* states that "the water administrative department of a higher level government shall consult the governments concerned for development of transjurisdictional water quantity allocation schemes, which shall be carried out after being approved by the government at the same level." *The Policy of Aquaculture Industries, 1997,* requires management of water utilization through a quota system and that charges are levied for water use in excess of the quota. The policy of water quantity allocation on the basis of a quota system requires a solution to satisfy the demand of various administrative areas for water resources.

  Waste load control includes not only the waste load control of an area but also the waste load control of a basin. The waste load control of a basin usually involves the distribution of waste discharge among different administrative areas. Currently in China, only those water bodies that have attained waste discharge standards but failed to attain water environment standards are subject to waste load control. However, the identification of waste load is not wholly based on assimilation capacity of water bodies, but also on the economic and technologic conditions of the country and the capacity of waste discharge reduction of enterprises.

- **Policies concerning Settlement of Water Disputes through Negotiation and Consultation:** China traditionally resolves transjurisdictional water disputes through negotiation and consultation amongst different local governments, instead of through judicial procedures. *The Water Law 1988* states that; "water disputes among different areas shall be settled in accordance with the principles of mutual understanding and cooperation. Those that have failed to be settled through negotiation and consultation shall be subject to the disposal of a higher level government". The revised Water Law stipulated on August 29, 2002 also states that; "water disputes among different administrative areas shall be settled thorough negotiation and consultation. Those that have failed to be settled through negotiation and consultation shall be subject to the arbitration of a higher level government, whose decision shall be complied by various parties concerned." Here, arbitration of governments has been used as the final resort for settlement of disputes.

  With regard to settlement of transjurisdictional water pollution disputes, the WPPC Law also states that; "transjurisdictional water pollution disputes shall be settled through negotiation and consultation of various local governments concerned, or through coordination of a higher level government." The advantage of the dispute settlement through administrative negotiation, consultation or coordination rests with its efficiency in dealing with some emergent situations. Its disadvantage is that administrative coordination usually focuses too much on the problems themselves and ignores fundamental resolution of the problems. Sometimes disputes can be settled for a time under the strong pressure of administrative power, but new similar disputes will occur again at any time. China adopts this kind of policy because the administrative departments are comparatively more powerful and authoritative; courts sometimes are not capable of enforcing judicial decisions.

4.3.2. Main Legal Prescriptions and Administrative Decisions Influencing Transjurisdictional Water Resources and Water Environment Management

In summary, transjurisdictional water resources and water environment management in China are mainly influenced by the following:

- Prescriptions on Water Environment Management in *the Constitution*
- Prescriptions concerning Transjurisdictional Water Environment Management in various Laws, including:
  - The Water Law (there are no Implementing Rules for the 2002 revised law)
  - WPPC Law and its Implementing Rules
  - Water and Soil Conservation Law
  - Flood Control Law
  - Fishery Law: This law was first promulgated in January 1986, and revised in 2000. Many fishery resources are characterized as transjurisdictional requiring integrated planning and management.
  - Prescriptions on Transjurisdictional Water Environment Management in Administrative Regulations
  - Statutes concerning the Management of Waterways of the PRC

- Statutes concerning Flood Control of the PRC
- Implementing Rules concerning Water Intake Permit Systems
- Provisional Regulations concerning Water Pollution Control of the Huai He River Basin (1995)

- Prescriptions contained in various formal responses from the State Council, including:
  - Reply of the State Council concerning the Water Pollution Control Plan and the Ninth Five-year Plan of the Huai He River Basin, and which reinforces the requirement for comprehensive and integrated planning and management.
  - Reply of the State Council concerning the Ninth Five-year Plan and the 2010 Plan of the Water Pollution Control of the Tai Hu Lake specifically provides for the coordination and cooperation between the relevant local governments and the relevant department under the State Council on pollution control of the Tai Hu Basin.
  - Reply of the State Council concerning the Water Pollution Control Plans of the Upstream of the Yangtze River requiring that the people's governments of Chong Qing City and Si Chuan Province shall be responsible for the water environment quality within the boundary of their jurisdiction, and shall ensure the attainment of water quality standards within prescriptive time limit.
  - Notice of the General Office of the State Council concerning the Approval of the Water Pollution Control Plan of the Hai He River Basin which affirmed the recommendations concerning settlement of transjurisdictional pollution disputes related to the South Canal of Zhang Wei and proposed in the Plan.
  - Notice of the State Council concerning the Approval of the Ninth Five-year Plan and the 2010 Programs for the Water Pollution Control of the Liao He River Basin and which mirror the decision on water pollution control for the Hai He River Basin (above).
- Prescriptions concerning Transjurisdictional Water Environment Management in Administrative Regulations: Besides the national laws and administrative regulations developed by the State Council, some relevant departments of the State Council have also developed administrative rules concerning water environment management. The following are among those rules that are related to transjurisdictional water environment management, especially to transjurisdictional water pollution control.
  - Provisional Measures for Management of Water Pollutant Discharge Permits: Article 13 provides that transjurisdictional polluter enterprises shall submit their Waste Discharge Permits and Provisional Waste Discharge Permits to the environment protection administrative department of the State Council for confirmation and approval of waste discharge total. Article 21 provides that waste load control upon transjurisdictional water bodies shall be subject to the integrated coordination of a higher level environment protection administrative department in accordance with the requirement of water quality plans.
  - Regulations concerning the Pollution Control and Management of the Drinking Water Source Protection Zones: Article 5 provides that the establishment and water pollution control of transjurisdictional drinking water source protection zones shall be incorporated into the plans for economic and social development and the plans for

water pollution control of relevant basins, areas and cities." Article 6 provides that the upstream areas of transjurisdictional rivers, lakes, reservoirs and canals shall not affect the water quality requirements of the downstream drinking water source protection zones. Article 21 provides that the delineation and managerial measures of transjurisdictional drinking water source protection zones shall be negotiated by the various levels of governments within the boundary of the protection zones, and shall be subject to the approval of a higher-level government.

- Regulations concerning the Procedures for Investigation and Settlement of the Pollution Accidents of Fishery Water: Article 11 provides that " transjurisdictional pollution accidents of fishery water shall be settled through negotiation and consultation of relevant local governments in accordance with Article 26 of the WPPC Law, or settled through the coordination of a higher level government. The responsible institutions shall actively cooperate with relevant local governments in resolution of the accidents."
- Measures for Management of the Natural Protection Zones of Aquatic Animals and Plants details that "the management of transjurisdictional natural protection zones of aquatic animals and plants shall be subject to the negotiation and consultation of the responsible fishery administrative department of a higher level government with the local governments concerned. Those that have failed to be ascertained through negotiation and consultation shall be subject to the decision of a higher-level government.
- Regulations concerning the Pollution Prevention and Control of Ship Garbage and Riparian Solid Waste in the Yangtze River Basin: This regulation is the first that specifically addresses pollution prevention and control of solid waste in transjurisdictional rivers, and has alleviated the problem of solid waste pollution of the Yangtze River.
- Trial Measures for Management of Waste Discharge Permits of Major Water Pollutants of the Huai He and Tai Hu Basin (2001): This is the first administrative regulation wholly addressing permit management for pollution control of basins.
- Notice concerning Strengthening Environmental Supervision and Management in Dry Seasons to Avoid Pollution Accidents (2001): obligates EPBs to jointly investigate transjurisdictional pollution accidents.

- Prescriptions concerning transjurisdictional water environment management in local legislations: At this time there are some 70 local regulations and rules on transjurisdictional water environment management in the Yellow River basin provinces. As noted in Chapter 5, these tend to mirror the provisions contained in national legislation.

4.4. Analysis on the Policies and Legislations concerning Transjurisdictional Water Environment Management

Although the development of a policy and legislative framework for transjurisdictional water resources and water environment management has been developing rapidly in China it lacks a

systematic integration and coherency, especially within the main laws (WPPC and Water Laws). The major deficiencies include:

- **A Lack of Delineation and Definition on Water Use Right of Upstream and Downstream Areas on the Aspect of Water Right Policy**
  Water Right includes the two aspects of ownership and use of water. The Constitution and relevant laws have already provided for water ownership. The key point here rests with water use rights which are not defined in the law in regards to legal rights of upstream and downstream jurisdictions and how these interact.
- **A Lack of Effective Policies concerning Water Quality Standards**
  There is nothing in the legal framework that provides any guarantee that water quality leaving one jurisdiction is suitable for the next jurisdiction.
- **A Lack of Concrete Policies concerning Comprehensive Development and Utilization**
  Although a large number of laws and documents in China provide for integrated planning and comprehensive utilization of water resources, there is a lack of specific policies on comprehensive development and utilization for transjurisdictional rivers and lakes. The various areas within a basin usually adopt those development and utilization policies that are to their own benefit; different industries and departments also make decisions related to transjurisdictional water environment only in accordance with their own needs.
- **Lack of Policies concerning Comprehensive Decision-making and Management**
  Transjurisdictional water environment management involves the division of managerial and supervisory power of various areas and departments, as well as the decision-making upon important issues. The so-called “Eight dragons in control of Law” phenomenon appears mainly due to lack of a mechanism for comprehensive decision-making and management of transjurisdictional water environment in China. Various departments and areas conduct management and decision-making only in consideration of their own interests and needs without integrated coordination.
- **Lack of Systematic and Explicit Policies concerning Dispute Settlement**
  Transjurisdictional water environment management concerns a variety of areas, departments and working units, all of which have different requirement and interest for water development and utilization and will inevitably have conflicts, contradictions and transjurisdictional disputes. Although some Chinese laws have dealt with these problems to some extent, on a whole there is a lack of systematic, explicit and specific policies on settlement of transjurisdictional water environment disputes, as well as specific responsible institutions and complete procedures for dispute settlement. Absence of closure in disputes can, in some cases, lead to drastic actions taken by local citizens.
- **A Lack of Completeness in Legislative System**
  From the above-mentioned legal framework on transjurisdictional water environment management, the legislative incompleteness on this aspect can be easily detected.
- **A Lack of Comprehensive Legislations concerning transjurisdictional water environment management.**
  Prescriptions on transjurisdictional water environment management are not complete and systematic, dispersed in various relevant legal documents, and are hard to operationalise in comprehensive and systematic management of transjurisdictional water environment.

- **A Lack of Separate Legislations concerning the River Basins Decided to Be Important by the State**
  The river basins decided to be important by the State, including the Yangtze River, Yellow River, Zhu Jiang River, Huai He River, Hai He River, Liao He River, Song Huajiang River, are all characterized in different natural geographies, economic development and human activities, and need to be managed in an integrated manner with full consideration of their characteristics. However, there exists not a single legislation like that currently. Although the Yellow River Law is under draft, it is unlikely to be adopted within a short period of time and is, institutionally, out of step with international river basin management practices. We comment on this further in Chapter 6.
- **Lack of Prescriptions on Procedures**
  Currently, the references to transjurisdictional management in current legislation lack procedural prescriptions, therefore leading to ambiguity of interpretation and practice. This can lead to widespread differences in the application of the law and little guidance to officials or to the judiciary when adjudicating disputes.
- **Lack of Completeness in Managerial Systems**
  Legislation involving transjurisdictional water environment management has provided for managerial systems; however, the roles and mandates are often overlapping between different pieces of legislation. A holistic and integrated approach is required.
- **Lack of Managerial Systems essential for Transjurisdictional Water Environment Management**
  Transjurisdictional water environment management has certain unique requirements that are now lacking in the legal framework. This includes:
  - Mechanisms for Economic Compensation between Upstream and Downstream Areas
  - A system for water rights trading
  - Incomplete rules for waste permit trading
  - Defined, transparent system for access and dissemination of water information, including cases of accidents and emergencies.
  - A system for the identification and assessment of damages from pollution
  - Pollution Damage Insurance
  - Lack of legal basis for a downstream jurisdiction to force an upstream jurisdiction to take specific actions.
- **Other Serious Deficiencies**
  - Poor coordination between MWR and SEPA for basin-level planning
  - Failure to properly implement basin pollution plans and no accountability for such failures.
  - Conflict of interest by local EPBs and local officials in regards to dependency on waste discharge fees.
  - Lack of integration or accountabilities for transjurisdictional monitoring, reporting, and administrative actions when pollution is reported.
  - An Inappropriate institutional arrangement such as the WRPB, which is now solely the responsibility of MWR, yet reports transjurisdictional data to SEPA. The River Basin

Commissions also have no jurisdiction over comprehensive water management when pollution is not included in their mandate.

- No public participation, and no role for the public in ensuring that local officials do, in fact, implement the law, plans, discharge enforcement, etc.
- Working units or individuals who make complaints concerning public issues, have no right to sue through the courts to enforce the public good.

4.5. The 1996 WPPC Law and Implementing Rules[10]

4.5.1. Introduction

A major task of the project has been the analysis of the environmental legislative framework in general, and of the WPPC Law and its implementing regulations, in particular.

As result of a number of problems both within the law, of changing views of issues such as basin level management and other factors, the State Government undertook to revise the 1984 WPPC Law. The new law, promulgated in 1996 retains and expands upon much of the content of the 1984 law. There are three key areas of change in the 1996 law:[11]

a) Strengthen basin level management for water pollution prevention and control

Issue: In the 1990s, river basin pollution and water quality aggravation of water bodies was quite noticeable. Transjurisdictional basin pollution problems and disputes occurred one after another, with long delays in resolution. The old practice of water pollution control planning and management purely on the basis of administrative jurisdiction could not effectively deal with the problem of basin pollution. It was essential to establish and improve a legal system for unified basin level planning and management to coordinate the control of transjurisdictional water pollution of rivers and lakes. The responsibilities of local governments concerning water environment protection should be specified in river basin plans. The objectives and tasks of river basin environmental protection should be incorporated in the economic and social development plans of local governments. At the same time, the legal systems for resolution of transjurisdictional pollution disputes shall be established and improved.

b) Emphasis on centralized treatment of urban sewage

Issue: The establishment of drainage pipe network and sewage treatment facilities fell far behind the development of cities. Sewage pipe networks often did not match each other in some areas. Shortage of operation funds meant that some sewage treatment plants were not in operation most of the time. It was essential to develop a legal system that enabled a more systematic approach to sewage management including construction, maintenance, fees, etc, based on “polluter pays” principle.

[10] This section is taken from the report on the WPPC Law prepared by Cai and Li.

[11] The DRIL was not promulgated until 2000 and discussions with local officials and experts suggest that, at least in the area of transjurisdictional pollution management, changes in the law have not had a significant impact.

c) Strengthen protection of drinking water source

Issue: Drinking water sources were threatened by the rapidly increasing waste discharge and the expansion of water pollution from urban areas to rural environments. Protection of drinking water sources became a noticeable problem in connection with public health and industrial and agricultural production. Under the present economic circumstances that overall control of pollution is not possible, it was necessary to develop special legislation for protection of key water bodies.

Besides the above-mentioned three aspects, the following content was added to the WPPC Law (1996): incorporating public opinion into environment impact statements, load control of major pollutants, elimination of techniques and equipment that cause severe pollution, management of non point source pollution, etc.

The State Council promulgated a new DRIL on 20 March 2000 to implement the WPPC Law (1996). The DRIL 1989 was annulled simultaneously.

4.5.2. Achievements and Problems of the WPPC Law in Prevention and Control of Water Pollution in River Basin Management

In *the Regulations of the State Environment Protection Administration concerning the technique policies for Water Pollution Control (1986)*, river basin planning has been stipulated as one of the three key technique policies. The WPPC Law (1996), which has legalized basin level environmental management, is an affirmation of this policy. Briefly, the achievements and problems of the WPPC on basin level management are demonstrated mainly on the following aspects.

- **Develop Unified Plans for Water Pollution Control on the Basis of Basins or Regions**
  Article 10 of the WPPC Law (1996) has expressly provided for development of unified basin or regional plans for water pollution control, as well as the formulating procedures, legal characteristics and implementation of the plans. Article 2 of the DRIL has also provided for specific contents of the plans. In accordance with this Article, the State Council and the people's governments of provinces, autonomous regions and municipalities directly under the Central Government have developed many basin and regional plans of water pollution control. The formulation and implementation of unified basin or regional plans have laid a foundation for coordination of the water pollution control within river basins, and will undoubtedly play an important role in reversing the aggravating trend of water pollution of major river basins.

  There is nothing wrong with the requirements for developing basin level plans. The problem is that there is no legal clarification concerning the combination and coordination between the plan (the plan for water pollution control) stipulated in the WPPC Law and the plans (the comprehensive plan of river basins and the plan for water resource protection of river basins) stipulated in the Water Law (1998). If those plans mentioned

above are not integrated, repetitive work, waste of limited administration resources, overlap or conflict will occur in the implementation of the plans, and therefore the effect of these plans will be in great doubt. Additionally, it is still insufficient just to stipulate for development of plans, we have also to consider the reasonable basis for developing the plans, as well as the authority, legal effect and implementation of the plans. Some plans were not developed on a realistic basis, while some other plans were not authoritative enough without legal force. Furthermore, there exists a serious problem of violating plans arbitrarily and not implementing plans at all. There is a lack of effective supervisory measures and a lack of safeguards for implementation of plans.

- **Waste Load Control of River Basins and Waste Discharge Permit**

This measure applies only to the water bodies of river basins that have attained waste discharge standards, but still failed to attain national water quality standards.

Articles 6 to 10 of the DRIL have provided for waste discharge permits, and the formulation, contents, implementation schemes, and quota allocation in connection with waste load control. In accordance with these articles, the waste load control plans of important basins shall be developed by SEPA with joint efforts of other relevant departments and local governments, and be reported to the State Council for approval. Other waste load control plans of transjurisdictional water bodies shall be developed through negotiation of relevant governments of provinces, autonomous regions and municipalities directly under the Central Government. In September 1996, the State Council approved *the Waste Load Control Plan of Major Pollutants during the Ninth Five-year Plan*

Waste load control is of great significance to water pollution control of river basins. The problem here is that:

1. Before the scientific delineation of water function zones and identification of water assimilation capacity, the basis of waste load control is still in doubt. What relates closely with it is how to rationalize the allocation of waste load quota and on the reduction of waste load quota by waste discharge units.
2. The basis of plans formulated either under the auspices of SEPA or in consultation with local governments should be the delineation of water function zones of river basins. However, according to the present practice of China, the functions of water bodies of river basins are under management of the water conservancy departments. Therefore, the competent water conservancy departments, environmental protection departments and local governments are inevitably in conflict with each other on determining total discharge amount and on management of waste discharge permit, etc.
3. In accordance with Article 16 of the WPPC Law, the detailed measures for waste load control shall be developed by the State Council; in accordance with Article 9 of the DRIL, the measures for allocation of waste load quota shall be developed by the environmental protection department of the State Council in consultation with other

relevant departments of the State Council. However, so far these measures have not yet been developed, and therefore there is a lack of legal basis for the implementation of waste load control.

- **Monitoring on the Transjurisdictional Water Environment Quality of Major River Basins**

  Major river basins usually stretch from one province to another, and water pollution disputes among upstream and downstream provinces are frequently seen. Due to the lack of clear measurement standards and proper management measures, successful resolution of this kind of dispute is usually delayed for a long period of time. Article 17 of the WPPC Law states that the environment protection department of the State shall develop water environment quality standards applicable to transjurisdictional water bodies of major river basins, and such standards shall be carried out after being reported to and approved by the State Council. Article 18 empowers the basin level water resource protection agencies to be responsible for monitoring the water environment quality of such transjurisdictional water bodies of the river basins where the monitoring stations are located, and to report the monitoring findings to SEPA, the MWR, and the basin level water resource protection institutions. All those stipulated have provided for a scientific basis for the management of transjurisdictional water environment quality.

  However, it is not legally clarified that if the transjurisdictional water bodies exceed standards, whether the government of the upstream areas should be held for corresponding liabilities and how this might occur.

  Next, under the circumstance that there are transjurisdictional water environment quality standards, there should be legal clarification with regard to the designation of an authoritative institution from the water resource department and the environment protection department for supervision and management against violating acts in case controversies arise.

  Besides, Article 18 of the WPPC Law states that monitoring findings shall be reported in a timely manner to SEPA, MWR and to the basin level water resource protection institutions. This involves a problem of managerial systems and designation of an authoritative institution for approval of monitoring funds. Article 13 of the DRIL states that monitoring of transjurisdictional water environment quality of major rivers must be conducted in accordance with the regulations concerning water environment quality monitoring developed by SEPA. That also involves another problem of the combination of water conservancy monitoring regulations and environment monitoring regulations.

- **Resolution of Transjurisdictional Water Pollution Disputes and Reporting of Water Pollution Accidents**

  Article 26 of the WPPC Law states that transjurisdictional water pollution disputes shall be settled through consultation of relevant local governments, or through mediation of the government of a higher level. Item 4 of Article 19 of the DRIL states that, where a water

pollution accident causes or has the potential to cause transjurisdictional harm or damage, the people's government at or above the county level at the place in which the accident occurs shall promptly notify the relevant local people's government that is exposed to or has the potential to be exposed to the harm or damage of the time, of the location and the type of the accident, the type and amount of pollutants discharged, together with preventative measures that need to be adopted.

Seen from the above, the WPPC Law and the DRIL have directed that the reporting of a transjurisdictional water pollution accident and settlement of water pollution disputes are responsibilities of relevant local governments, without identification or designation of a specific responsible department of the local governments to be in charge. This has resulted in unclear responsibilities and duties of government organizations. Furthermore, resolutions are stipulated to be mainly through consultation or coordination, involving no judicial procedures. This has resulted in the problem of inefficiency in resolution of disputes.

This kind of provision cannot achieve any practical effect unless there is active cooperation between the related governments. When local protectionism exists, the relevant local governments are often reluctant to perform their obligations of reporting and may refuse to accept or hear the appeals of the parties concerned, or delay handling the dispute. This usually induces accidents or disputes on a larger scale. Unfortunately, this tends to reflect current reality in China with regard to transjurisdictional water disputes.

- **Institutions**

  Institutional problems have been noted numerous times above. In fact, communication between different management departments is the key to transjurisdictional environment management. It is unfortunate there has been little progress in institutional development and on clarification of functions and duties of individual institutions in the WPPC Law (1996) and the DRIL.

  According to the WPPC Law, the organizations and their functions and duties concerning transjurisdictional water environment management are as follows:

  - Various levels of government are responsible for developing or approving unified basin level plans for water pollution prevention and control (Article 10), delineating water source protection zones (Article 12, 20), developing a system for waste load control and for checking and ratifying major pollutants (Article 16).
  - Environment protection departments shall be responsible for exercising unified supervision and management for prevention and control of water pollution (Article 4). However there is no clarified interpretation on *unified supervision and management*, which results in the vagueness in identifying the functions, duties and power of environmental protection departments.

- The navigation administration sections under various levels of communication departments shall be responsible for exercising supervision and management of the pollution caused by ships. (Article 4)
- Water conservancy departments, public health administrations, geological and mining departments, municipal administrative departments shall assist environment protection departments in supervision and management for water pollution prevention and control in combination with their functions and duties (Article 4). There is also a lack of clarification in interpretation of "assist in management". Each department concerned gives its own interpretation in light of its own understanding, which results in overlaps of functions and duties of various departments. Therefore, there are many institutional conflicts with regard to implementation of the law. That is especially the case between water conservancy departments and environmental protection departments.
- The water resource protection organizations for major river basins shall be responsible for monitoring the water environment quality of the transjurisdictional water bodies of the river basins where they are located, and shall report the monitoring findings to the SEPA, the MWR, and the basin level water resource protection organizations (Article 18). However with regard to the basin level water resource protection organizations, its functions and duties are not clearly defined.

4.6. The Revised Water Law

On August 29, 2002, the Standing Committee of the National People's Congress passed the amendment of the 1998 Water Law. This has made improvements on legislative guiding principles and managerial content, measures and means. In regards to transjurisdictional issues it is, however, not complete especially insofar as clarifying the relationships and linkages with the WPPC Law. Certain important changes are noted as follows.

4.6.1. Improving Water Resource Managerial Mechanisms and Clarifying the Legal Status of Basin Level Management Institutions

The original Water Law has provided for a managerial mechanism of "a combination of integrated management with deGraded and separate management". It provides that " the water administrative department of the State Council shall be responsible for integrated management of water resources of the whole country. Other relevant departments of the State Council shall assist the water administrative departments in relevant water resource management in accordance with their functions and duties stipulated by the State Council. The water administrative departments and other relevant departments of the governments at or above county levels shall be responsible for water resource management in accordance with their functions and duties stipulated by the governments at the same level." The object of this kind of managerial mechanism was to put into play the initiative of various areas and departments on water resource management. But in reality it resulted in segmentation in water resource management, each doing things their own way, competing for greater power and deferring negative aspects of the law.

The revised Water Law has provided for a new mechanism "combining basin level management with local level management based on administrative areas", and especially emphasized upon the functions and duties of basin level management institutions as follows: "the basin level management institutions established by the water administrative department of the State Council in rivers and lakes decided to be important by the State (hereinafter called the basin level management organizations), shall exercise the functions and duties concerning water resource management and supervision stipulated by laws and administrative regulations and authorized by the water administrative department of the State Council within the areas under their jurisdictions." Other relevant departments of the State Council are only responsible for "the work related to the development, utilization, saving and protection of water resources in accordance with their respective functions and duties." They are not responsible for "management" any more as stipulated in the original Water Law. This kind of change on managerial mechanism has strengthened the status and authority for integrated management by water resource management institutions, and facilitates integrated allocation and comprehensive development and utilization of water resources. Meanwhile, the legal status of basin level management institutions has been clarified with the authorization of supervision and management functions, which is in conformity with the characteristics of water resources whose natural unit is basin, and has been proved to be efficient by international experiences.

The negative aspect of this is that pollution management – an essential part of integrated and comprehensive water resources management, is exercised independently by SEPA according to the WPPC Law. While it is common international practice to have two laws – one on water quantity and one on pollution control, the key is in their effective integration in practice. This is not the case in China.

4.6.2. Economical Utilization of Water

The original Water Law mentioned economical utilization of water in only two of its provisions, however the new Water Law has incorporated economical utilization of water into one of its legislative objectives of "combining water resource development with economical utilization of water and giving priority to economical utilization of water", and has been added with a chapter named "Allocation and Economical Utilization of Water Resources". 14 of the 82 provisions of the new Water Law have either directly mentioned "water saving" or addressed the issue of "economical utilization of water". Meanwhile, more than 10 provisions are related to water saving. All these provisions have provided for a series of measures concerning economical utilization and waste reduction of water resources. With the expansion of development, an increase in population, the tremendous demand for water consumption, and limitation of available water resources, economical utilization of water is the key to future water resource management in China.

4.6.3. Emphasis on Systems for Water Resource Planning

Although the original Water Law outlined a system of water resource planning, the related provisions are too general and simplistic, and there is a lack of prescriptions concerning the formulating procedures of plans and concerning the relationship between various plans. Firstly, the new Water Law has been added with the provisions concerning the strategic plan of the water resources of the whole country,[12] the development procedures of various plans. Secondly, it has divided plans into basin plans and local plans, both of which are further divided into comprehensive plans and special plans. All kinds of plans have been legally defined, [13] and the formulating procedures of various plans have been stipulated. The relationship between various plans have been stipulated as: local plans for areas within basins shall be consistent to basin plans; special plans shall be consistent with comprehensive plans. The comprehensive basin plans, comprehensive local plans and the special plans that are closely related to land utilization shall be consistent with national economy and social development plans, overall plans for land utilization, overall plans for urban construction and environment protection plans, with full consideration of the needs of various areas and vocations.[14]

4.6.4. Coordination of Water Resource Development and Utilization with Ecologic Protection of Water and Control of Water Pollution

The original Water Law attached relatively little importance to ecologic protection of water and ecologic use of water. The new Water Law has changed the model of emphasizing only water quantity allocation, water project protection, and flood control. It has paid some attention to ecological protection of water resources and control of water pollution, and its various chapters all reflect the protection of water ecology. As an example, the chapter on " Protection of Water Resources, Water Bodies and Water-related Projects" states that "the water administrative department of the governments at or above the country level, the basin level management institutions and other relevant departments shall pay attention to maintenance of reasonable flow in rivers and proper water level in lakes and reservoirs to keep the assimilation capacities of water bodies, while developing water resource development and utilization plans and allocating water resources." [15] and " ….maintenance of the rational volume of flow of the rivers and the rational water level of the lakes, reservoirs, and groundwater, and the maintenance of the natural purifying capacity of the water."[16] The many provisions that include ecological protection have been integrated with water pollution control to some extent.

[12] See Article 14 of the Water Law 2002

[13] See Article 14 of the Water Law 2002

[14] See Article 15 of the Water Law 2002

[15] See Article 30 of the Water Law 2002

[16] See Article 30 of the Water Law 2002

4.6.5. Strengthening Prescriptions Concerning Water Dispute Settlement

The revised Water Law contains a special chapter on "Water Dispute Settlement and Supervisory Inspection upon Law Enforcement", and has adopted the system of administrative arbitration that is binding and final for settlement of water disputes between administrative areas. The possibility for settlement of transjurisdictional water disputes through judicial procedures is excluded. For the water disputes between working units, between individuals, and between working units and individuals, the revised Water Law prescribes settlement through the combination of negotiation, administrative mediation and judicial procedures. This kind of mechanism for resolution of disputes suits the political situation of China insofar as administrative authorities are more powerful, and can settle transjurisdictional disputes quickly. These provisions do not include transjurisdictional pollution disputes.

4.6.6. New Provisions Concerning Legal Liabilities

Although the original Water Law has provided for many compulsory requirements and obligations, legal liabilities are mainly fixed only for violations of the regulations concerning water-related project protection, or water intaking and water use. Liabilities are not fixed for other acts in violation of the regulations concerning rational development and utilization of water resources, water saving and ecological protection. For example, In accordance with the original Water Law, "construction of dams in the passage of fish, lobsters and crabs with serious impact upon fishery resources shall be subject to construction of facilities for passage of fish or adoption of other remedial measures by construction entities" [17] However, there is no prescription concerning the legal liabilities of these kinds of illegitimate acts. The revised Water Law has detailed corresponding legal liabilities for those acts in violation of compulsory and obligatory regulations; it has also outlined specific punishments. This will facilitated law enforcement, and can avoid improper enforcement of law and abuse of power by administrative departments.

4.6.7. Deficiencies of the Revised Water Law

Although much progresses has been made in the revised Water Law in comparison with the original one, there are still deficiencies existing in it, due to the legislative drafting mechanism, the water resource management sense of management institutions and the limitation of some external conditions.

[17] See Article 18 of the Water Law 1988

4.7. Specific Problems between the WPPC Law and the (revised) Water Law for Transjurisdictional Water Pollution Management

While the revised Water Law provides greater clarity for water resources management, the following major areas require further attention so that the authorities and responsibilities under the two laws are clear and transparent. For most issues the problem is one of harmonizing the two laws in a coherent way. Elsewhere in this report we make specific recommendations on the institutional requirements that are needed to deal with the various problems between these two laws.

- **Lack of common terminology**
  Both laws should adopt standard terminology. A good example is the ambiguity in the term "water resources" which MWR takes to mean quantity and quality, whereas SEPA takes to mean only water quantity. Another example is the inconsistency in terminology for protection zones between the two laws.
- **Basin level planning for water quality and quantity**
  While the two laws appear to be relatively consistent in this regard, the arrangement is awkward and clearly does not work well. In the Water Law (Article 17) the water department, with other State agencies, develop a comprehensive water management plan. One would assume that water pollution is implicitly included. However, in fact, SEPA regards "water resources" as being restricted to water quantity and related issues. Therefore, the basin pollution plan is developed by SEPA, pollution quotas are assigned to the various provinces according to the national five-year targets, and the plan is administered by the provincial EPBs. The plan is not developed in harmony with water resource planning so that in-stream water quality cannot be included as a technical reality as part of the outcome of pollution planning. This is contrary to accepted international practice and is a root cause of failures in pollution and water resources management in China.
- **Basin level management of water pollution**
  The legal framework is clear that pollution management is the responsibility of SEPA. However, the transjurisdictional aspects which are critical to success of basin management are not clear in either law. Both laws provide for the water department to carry out water quality monitoring at provincial boundaries, however neither law is specific about the legal requirements of either agency when pollution is found. Currently, the WRPBs report data to SEPA, however there is no specific obligation for SEPA to respond or to provide feedback to the WRPB concerning the outcome. The situation has deteriorated due to the formal withdrawal of SEPA from the WRPBs in 2002. Both the Water Law and the WPPC Law affirm the need for basin-level planning and management. However, there is no institutional mechanism in either law for effective and coordinated management by MWR and SEPA at the basin level. Elsewhere in this report we provide recommendations on institutional solutions to this problem.

- **Water function zones as management units**
  Article 32 of the Water Law provides for joint development of water function zones. However, in practice this activity seems to be divided between water function zones of the MWR, and some 13,000 water environment function zones of SEPA[18]. The latter are not specifically mentioned in the WPPC Law however the Implementing Rules provide details. There are significant differences in procedures between the two laws. These are not harmonized with the consequence that integrated management of water is not possible. Both ministries will, rightfully, claim that their activities are within the relevant laws. In fact, both laws implicitly require harmonization and we conclude therefore that both ministries have decided to go their own way on this matter. This is both an institutional and legal failure and should be corrected.
- **Transjurisdictional management**
  Under the two laws SEPA establishes water quality standards at provincial boundaries (not implemented by 2003). The WRPB is to monitor the water quality at these locations. Neither law indicates the basis, or mechanisms, by which the downstream jurisdiction can legitimately claim against an upstream jurisdiction for causing transjurisdictional pollution except when specific damages can be demonstrated. Similarly, there is nothing in the laws on the obligations of the MWR to maintain river flows to a level where in-stream standards can be met. In this project we frequently hear complaints about operation of sluice gates which cause discharge conditions that exacerbate pollution. Generally, this reflects the lack of integrated management at the basin level.

[18] As reported by SEPA at World Bank Hai River Basin project meetings, Tianjin, Nov., 2002.

5. LOCAL LEGISLATION[19]

5.1. Introduction

A review of all location (provincial) legislation for all nine provinces of the Yellow River Basin in the general area of environmental protection and water resources (quantity and quality) was carried out. This covered the following topics:

a) Water Resources Management
- Comprehensive water resources management
- Other water resources legislation, including permits laws, irrigation use, fees, etc.

b) Water Pollution Control
- Comprehensive legislation for environmental protection
- Comprehensive legislation for water pollution control.
- Water pollution control of the mainstream within provincial jurisdiction
- Water pollution control of tributaries within provincial jurisdiction.
- Other legislation on pollution control (waste fees, etc.)

c) Other Legislation for Water Pollution Control
- Water and soil conservation legislation of the Yellow River Basin
- Land resource management of the Yellow River Basin.
- Canal management in the Yellow River Basin.
- Fisheries administration in the Yellow River Basin
- Flood Control in the Yellow River Basin
- Water Conservancy project management in the Yellow River Basin

All nine provinces have enshrined a number of basic principles in their legislation – state ownership of water; comprehensive utilization of the resource; and "economical" utilization of water. For water pollution management, all nine provinces espouse the following principles – balance between environment and economic development; polluter pay principle; and emphasis on prevention. These reflect the provisions of national legislation.

All nine provinces use "unified supervision and management" in which water pollution management and control is within the jurisdiction of environmental protection bureaus where such activities are integrated.

[19] This chapter is taken from the report, "Review on Local Legislations Concerning Water Resource Protection of the Yellow River Basin" by WANG Canfa, prepared as part of this TA Project.

5.2. Disputes

Recommendations on new dispute resolution procedures is provided in Chapter 8. Here we deal only with the nature of disputes insofar as it has been identified at local levels.

The provision for dispute settlement in the WPPC Law is:

"The environment protection administrative departments at the places where environment pollution or other public hazards originate shall be responsible for the control of transjurisdictional environment pollution and environment destruction. When disputes concerning compensation of losses or restoration from environment destruction occur, the disputing parties shall consult with each other. If the disputes fail to be resolved through consultation, the people's governments of a higher level shall coordinate and make decisions of resolution."

This is a general provision and is not sufficiently prescriptive to ensure closure to disputes. It does not describe individual's rights, provide for recourse to the courts, for mediation or arbitration, or for closure.

Disputes over water pollution can be divided into two categories in accordance with the location where the disputes occur. The first category concerns disputes occurring within a jurisdiction; the other category concerns transjurisdictional disputes.

Intra-jurisdictional: Resolution of the disputes within a jurisdiction varies in accordance with the characteristics of the disputes. Administrative disputes may be resolved firstly through administrative review. If the parties subject to administrative review refuse to comply with the decision of administrative review, they may commence an administrative litigation in the people's courts. They may also directly commence an administrative litigation in courts without going through the procedures of administrative review. Civil disputes may be resolved firstly through mediation of relevant administrative organs. If the parties concerned refuse to comply with the decision of mediation, they may commence civil litigations in the courts. Of course the parties concerned may also directly commence civil litigation in courts without going through the procedures of mediation by administrative organisations.

Transjurisdictional Disputes: Only five provinces (regions) of Qinghai, Sichuan, Inner Mongolia, Shaanxi and Shandong have made special stipulations in this regard. For example, Article 10 of *the Regulations of the Inner Mongolia Autonomous Region concerning Environment Protection* contains the WPPC provision. Only Qinghai Province among the nine riparian provinces (regions) has developed special legislation exclusively dealing with pollution disputes; it is *the Measures of the Qinghai Province concerning Resolution of Disputes on Compensation of Losses from Environment Pollution*. Resolution of water pollution disputes has been stipulated in it.

5.3. Problems in Local Legislation Concerning Water Resource Protection of the Yellow River Basin

a) Progress in Development of Local Legislation Is Not Well Balanced

Although most of the provinces (regions) have established a legal framework on water resource protection, the development of various areas on the aspect of local legislation is not well balanced. In some provinces the legal framework on water resource protection is more complete, and the content is more reflective of local characteristics. For example, Shandong Province has developed 14 local pieces of legislation on this aspect, and has also stipulated some characteristic systems and measures. On the other hand, however, the legal framework of some other areas in this regard is far from complete. For example, although Henan Province has developed seven pieces of legislation on this aspect, few of them are directly related to water resource protection, and none of them are comprehensive legislation that deal exclusively with environmental pollution and water pollution control.

b) Too Much Repetition of the Provisions of National Legislations; Some Local Legislation Lack Local Characteristics

In most of the existing local legislation of the nine riparian provinces (regions) of the Yellow River Basin, there is too much repetition of the provisions of national legislation, and little inclusion of local characteristics. For example, the water resource managerial system (such as the water resource fee collection system), and the water pollution control system (such as the waste discharge declaration and registration system and the waste discharge permit system), stipulated in most of local legislations are almost completely the same as those stipulated in national legislations. Due to the lack of consideration of local characteristics in local legislation, the water resource protection systems of the upstream, middle stream and downstream of the Yellow River Basin lack variety that reflect local river conditions and therefore have detrimental effects on the water resource protection of the Yellow River Basin.

c) Some of the Local Legislations is not Operative

As the local legislation has not considered the specific situation of various administrative jurisdictions, and has too much repetition of the provisions of national legislation, some prescriptions of the local legislation of the nine provinces (regions) are not operative. An example is the implementation of the award system for environment protection. National legislation has provided for environment protection award in principle, and most of the province (regions) have simply patterned their legislation on this general principle, without more detailed and operative stipulations. Therefore the award system exists only in name.

d) Lack of Prescriptions Concerning Transjurisdictional Management

Local legislation of the nine riparian provinces (regions) has mainly focused on the issues of water resource protection within administrative jurisdictions, without consideration of the transjurisdictional cooperation in water resource protection, and thus have an unfavourable effect on the water resource protection of the whole Basin. The nine provinces (regions) may consider uniting to develop legislative documents concerning the water resource protection of the whole Yellow River Basin to facilitate the management of transjurisdictional water

resources as well as the resolution of transjurisdictional water disputes or water pollution disputes.

e) Non-Existence of a Complete Mechanism for Dispute Resolution

The mechanism for resolution of transjurisdictional disputes is not complete. Not all of the nine riparian provinces (regions) have made special stipulations on transjurisdictional disputes (especially on transjurisdictional pollution disputes). Even those that have done so, the provisions are far from complete. For example, Article 12 of *the Measures of the Qinghai Province concerning the Implementation of the Environment Protection Law* states: "Transjurisdictional prevention and control of environment pollution and ecological destruction, as well as resolution of transjurisdictional pollution disputes, shall be conducted through consultation of relevant local governments, or of the environment protection departments authorized by the governments, or through the coordination of the government of a higher level." Only administrative resolution is provided for here, no judicial procedures are involved.

f) Lack of Coordination and Cooperation Amongst Various Pieces of Legislation

There is a lack of coordination and cooperation among the nine riparian provinces (regions) on the aspect of developing local legislation concerning water resource protection, water pollution control, and water and soil conservation. Some contents are overlapping and conflicting with each other, while some issues are not dealt with by all the legislation. For example, Article 21 of *the Regulations of the Shandong Province concerning Water Resource Management* states: "As for the waste discharge into water conservancy projects including rivers, lakes, reservoirs and canals, the establishment or enlargement of waste discharge outlets shall be approved by water administrative departments before the waste discharge units declare to environment protection department." Article 22 states: "The water administrative departments at or above the county level have the power to conduct on-site inspection on the waste discharge units within their jurisdictions; the units being inspected upon shall provide truthful information and necessary documentations. The water administrative departments have the power to stop those that have seriously affected the function of water bodies with excessive waste discharge." However, Article 11 of *the Regulations of the Shandong Province concerning Water Pollution Control* states: "Waste discharge enterprises must submit *the Form of Waste Discharge Declaration and Registration* to the environment protection departments at the place where the enterprises are located in accordance with national or provincial regulations; As for construction, expansion, reconstruction and technological renovation projects, *the Form of Waste Discharge Declaration and Registration* shall be submitted within 15 days after checking and acceptance of completed projects." The occurrence of overlapping prescriptions is mainly due to various administrative departments failing to make effective coordination in legislation development with regard to departmental conflicts of interest.

g) Lack of Prescriptions Concerning Public Participation

Except for Shandong Province, none of the nine riparian provinces has stipulated the nature of public participation into environment protection activities. This demonstrates the fact that in many places resolution of water resource management issues is still, by custom, carried out purely by administrative departments, and the public is not involved and not welcome in water resource management and protection.

h) Too Much Stress on Punishment and Insufficient Attention to Awards

All of the nine riparian provinces of the Yellow River Basin have stipulated the provisions of punishment in relative detail. However, prescriptions concerning the award system are insufficient, and some provinces have made no stipulation at all. This is a manifestation of the traditional legal system which stresses legal consequences, inclusive of provisions for legal liabilities, but which excludes provisions for awards.

However, one of the characteristics for an environmental protection legal system is the existence of an awarding system, which could be of great significance in environmental protection by stimulating people to take active participation in environmental protection, and in carrying out and complying with environmental law. Therefore an award system should be stipulated in detail in the local environmental legislation.

6. RIVER BASIN MANAGEMENT

6.1. Introduction

In this TA project we have been requested to comment on institutional arrangements for river basin management. The current system of River Basin Commissions belonging to the Ministry of Water Resources is consistent with the traditionally strong role that the MWR has played over many years in water quantity management in China. The current system is deficient in a number of areas including that of integrated planning that includes water pollution management and in lack of representivity of the stakeholders of the basin. As noted elsewhere in this report, this is partly a result of inadequacies in the two main laws governing this sector – the WPPC Law and the Water Law. Further, the present system no longer reflects the international approach to integrated river basin planning and management.

A manual on integrated river basin management was developed under this TA project for a regional legislative drafting seminar. This chapter is drawn from the extensive set of examples of international experience that are provided in that Manual.

6.2. The Legal Context for Transjurisdictional Water Pollution and Water Resource Management

At the outset, it is important to understand that there is little legislation relating specifically to intra-national transjurisdictional water pollution management. In most countries, transjurisdictional issues (quantity and quality) are dealt with through a combination of the framework of Integrated River Basin Management (IRBM) and through the rigorous application of existing water resources and environmental laws at the state/province level. Indeed, in most developed countries, transjurisdictional pollution does not, in general, lead to disputes except in the case of environmental accidents and spills. In cases such as USA, Canada and Australia, water quality objectives or standards are specified at transjurisdictional boundaries and are coordinated within the framework of a basin-wide management approach but implemented according to existing environmental laws. For international basins subject to bi- or multilateral agreements, pollution is managed under the framework of local laws and the basin Agreement.

In the Chinese context, international experience in transjurisdictional pollution management contains a number of steps in law and practice. A breakdown in any one of these leads to transjurisdictional problems. For example:

- At the national level, there must be clarity of roles and good coordination between the various resource management agencies and ministries – water, soil and catchment protection, environmental protection, forestry etc? Any overlap or confusion at this level invariably ends up with greater problems at the state/province level.
- Environmental protection legislation or regulations at the state/province level must closely follow the national guidelines or framework legislation? All aspects of water pollution management must be included.

- The responsibilities and accountabilities of all the key provincial agencies or 'players' must be clearly specified and monitored for compliance?
- Regulations must be implemented effectively within a province, and across all aspects – licensing or permit issue, monitoring and surveillance, prosecution and penalties for breach of license conditions, reporting of overall performance in reducing/managing pollution?
- There must be clarity of roles and good coordination between the various regulators within a province covering, for example, water resources, soil and catchment protection, environmental management, forestry, agriculture etc? There must be some formal administrative mechanism within the provincial government that ensures good coordination occurs?
- At the basin level, there must be some form of formal administrative arrangement that coordinates basin wide or inter-provincial water pollution issues? Normally, it would have the power to set inter-provincial pollution targets and to monitor the performance of provincial agencies in meeting the targets? It would also have mechanisms for reporting and dealing with inadequate performance by a state/province?

A 'model' set of legislative and administrative arrangements that would successfully comply with the above key issues would contain the following elements:

- A coordinating mechanism at national level that would provide for inter-linkages of policy and strategy development across all aspects of natural resource management. This may be a National Water Resources Council or a Natural Resources Council or an Environment Council – whichever will provide the best coordination – and would normally be set up by a government (State Council) decision and would act in an advisory role to the State Council. Thus it would not have the power to either approve a new policy or to direct a minister to follow a particular action – rather it would recommend actions and if endorsed by all members of the coordinating council or at the higher level, would be implemented by the relevant minister. **This approach is achieved through administrative decision by government rather than through legislation.** Note that the Joint Meeting System in use in China since 1998 is not a substitute for the "council" mechanism recommended here.
- Each central government ministry would have in place clear and comprehensive framework legislation (water resources, environmental protection etc.,) that would specify national policies, strategies and guidelines and define how each state/province was to develop implementing regulations to cover the resource use and management activities within its area of administration. **This would include accountability, reporting and monitoring arrangements such that each province would understand what activities were to be undertaken, by whom and how reporting was to occur.** The current WPPC Law and the new Water Law cover many of these issues, however there still remain unresolved areas within each law (especially the WPPC Law) and between the two laws.
- Effective implementing regulations at the provincial level that, in terms of water resources, cover the assessment, planning, allocation, licensing, monitoring and policing of water resources and their utilisation, and in terms of environmental protection, cover the setting of water quality policies, strategies and standards in accord with national objectives, the

permitting/licensing of waste water discharges to achieve these standards, mechanisms to encourage or direct polluters to adjust to standards, monitoring and reporting of achievements and the on-going 'health' of the water environment. The comprehensive nature and the 'strength' of these provincial regulations and whether they are implemented in a uniform and complete way is often the key factor in good water pollution management – incomplete or poorly conceived implementation is often more of a problem than any perceived weaknesses in the legislation itself. **In the nine provinces of the Yellow River, provincial legislation follows national legislation however, in general, little effort has been made to tailor the legislation to local conditions.**

- A coordinating mechanism for all natural resource management agencies, bureaus, etc. at provincial level: This coordination is to ensure clarity of roles, and no overlap or conflicts. This would be similar to the national coordinating body mentioned above but may be simply some form of coordinating committee made up of senior managers that control the natural resource portfolios. Again, this would be set up through provincial administrative order, not legislation and be advisory in nature and report to the Governor or his delegate. Such a coordination group would likely collate reports on how the province had performed in terms on its environmental protection responsibilities and accountabilities and present these regularly to the central government.
- An inter-provincial or river basin (or part of basin) mechanism or organisation that is created under legislation but which has only a coordinating and planning role. Members would be the provinces in the basin and, usually, representation from State agencies. Direct management would still be the responsibility of the various provincial agencies covering natural resource management. It would be responsible for basin-wide water resource assessments, basin planning, recommend inter-provincial resource sharing and monitor utilisation of these shares, determine environmental management targets at provincial borders, develop strategies to achieve targets particularly for non-point source pollution and other transboundary impacts, develop trading and other economic instruments to allow unused water shares or under-utilised pollution rights to be traded between provinces, report of the on-going 'health' of the river basin or sub-basin, have a dispute resolution role etc.

More generally, IRBM is based upon the legal principles enunciated in the United Nations International Convention on Non-Navigable Uses of Watercourses . The UN has agreed on a seven Part (37 Article) convention that defines the context of international river basin co-operation. It has yet to be ratified by all countries. As would be expected, it has all the essential ingredients of a strong and flexible framework and covers the essential issues of;

- General obligations to cooperate
- Equitable and reasonable utilisation and participation
- Factors affecting the determination of bulk water shares
- Regular exchange of data and information
- Information and notification concerning planned measures with possible adverse effects
- Response to, and implementation procedures for, notified projects

- Prevention, reduction and control of pollution
- Joint management and regulation
- Settlement of disputes

The convention was written for application in international rivers, however the principles apply equally to any river system where transboundary impacts are an issue from one administrative area to another. In the case of China, this applies to inter-provincial rivers or inter-prefecture rivers.

The key points in the Convention that are of interest here are;
Article 5 - Equitable and reasonable use and participation. This addresses the need to develop a water sharing mechanism and also stresses the need to participate/cooperate in both the utilisation and protection of the river systems.
Are the participatory processes in the Yellow River basin consistent with intention of the 'Convention'? Is this an important issue for China?

Article 6 – Factors affecting how water shares are calculated.
Are these relevant to how provincial water shares on the Yellow River are calculated?

Article 7 – Obligation not to Cause Significant Harm. This applies equally from province to province as it does internationally.
Should the basin organisation be taking a stronger role in monitoring and resolving inter-provincial impacts or can this be dealt with effectively by a change in the legal framework that applies to local agencies for dealing with transjurisdictional issues?

Article 9 – Regular exchange of Data. Earlier in this report it was stressed that collecting water related data and making it readily available to all basin partners is fundamental to good basin management. This is a key part of the Convention
– does this occur in the Yellow River basin? Is there a need for the basin organisation to develop a 'Water Related Data and Information Sharing Protocol' so that everyone knows where data is held and how to access it?

Articles 11 to 19 – Articles covering the need to notify others of planned projects and how to go about assessing and consulting on likely impacts. Perhaps these are the most important articles in the convention as they provide a way of 'consulting and participating' on contentious issues which would otherwise quickly fall into a conflict.
This seems to be a process that Chinese authorities could investigate as a role for the basin commissions as it relates directly to the requirement of SEPA to find more participative and efficient ways of resolving disputes.

Articles 20 to 23 – Articles that stipulate the need for each member country, and any over-arching basin organisation to protect and preserve the environment. This implies that monitoring must occur to continually check that a basin's natural resource base is not being impacted on beyond certain agreed limits and that if harmful effects are found to be occurring (Articles 27 and 28) then immediate action must be taken.
This relates to the present situation in the Yellow River basin where transjurisdictional environmental impacts are frequently occurring.

The overall thrust of the UN Convention is that a fully consultative and participatory approach to IRBM must be followed if transjurisdictional conflicts are to be minimised and equitably resolved. International practice is now to move away from the traditional 'command and control' approach to solving disputes and to use 'consultation and participation' to develop a consensus solution. This often takes longer than imposed decisions but will be better accepted by all parties As in the case of the Murray Darling Basin Commission, the continual push to consult and participate has meant that in the 85 years of operation, never once has the Commission had to seek the input and decision of the independent referee – all parties have eventually reached consensus even though this may have taken a number of years in some cases.

6.3. Lessons Learnt in Integrated Basin Management

Integrated river basin management is a key concept in the development of transjurisdictional water management policies. Most countries that deal effectively with transjurisdictional water pollution manage this issue through some form of "integrated river basin management" (IRBM) framework. There are, however, many ways to carry out IRBM.

'River Basin Management' has been practised in many different forms throughout the world over the last 100 years or so, with varying degrees of success. In the early days, notable successes were often those that had a somewhat narrow charter or agenda; a bit like the Tennessee Valley Authority with a very strong development focus – power generation and navigation – and which, when established in the 1930's, tended to exclude the broader concepts of integrated natural resources management as is now more common. We can conclude that what was 'successful' 30 years ago, may well not be regarded as successful these days.

Despite these somewhat narrow focus successes, resource degradation problems in some of the long developed basins in the more developed countries have increased over the last 20 years or so and reached alarming proportions in some cases. This has led to a realisation that some of the more 'single issue' type of river basin organisations were far too narrow in how they went about water resources planning and management and often, did not get the most appropriate balance between economic development and environmental protection when water resources were both allocated and utilised. As well, decisions were often made based on the needs of one administrative unit – say, state, province or prefecture – rather than looking at the river basin as a whole.

In many cases, the focus on water quantity management was at the expense of water quality – a practice that has had particularly negative effects in North America and Australia in the past and in modern China and many developing countries. Recognition of this has led to a much more integrated approach to quantity and quality management in most developed countries so that the impacts on water quality of decisions on water quantity (as, for example, diversions for irrigation) are now part of the decision process for managing water quantity. In most cases, the integration has occurred through administrative and institutional processes and not necessarily through specific changes in legal frameworks. In the past few years, this has evolved one step further insofar as decisions on water quantity that have major impacts on river ecology are now examined within an integrated quantity-quality-ecology framework[20]. This integrated approach has, with the exception of emergency situations such as spills, greatly diminished transjurisdictional water quality disputes.

The problems of earlier forms of river basin management has led to many calls for a different and more participatory approach which involves all the stakeholders, governments or administrations within a basin with the aim of achieving a more acceptable balance in river basin development. 'River Basin Management' can no longer be driven by a single issue such as power generation or irrigation and it must be 'integrated' with a whole range of disciplines, attitudes and stakeholder or government aspirations. The principle of integrated water resource management (IWRM), although not a new concept, became an acceptable policy principle, especially after the world community endorsed this principle at the 1992 Dublin Water Conference.

Probably, the regions or basins where the most extensive forms of river basin management has occurred during the last 40 years – in differing extent and format, and different levels of success – are France and Spain, the UK, the Rhine basin, Australia (Murray Darling basin Commission), and the USA/Canada/Mexico region. These examples demonstrate that the various forms of integrated river basin management exist because there is a need to 'share' resources, or 'share' the impact of 'resource utilisation' in a better way than is allowed by the existing administrative or governmental structures or boundaries that invariably pay little attention to the hydrologic boundaries or characteristics of the overall basin. This does not mean that the individual state or provincial water and environment bureaus shouldn't continue to administer and manage resource utilisation within their region – it does mean that there needs to be some basin-wide or inter-provincial mechanism or institution that takes account of the basin-wide or inter-provincial policy and strategy issues and makes sure that the individual government members of the basin – the states or provinces – follow these guidelines in their management and implementation activities. In some cases, the laws were changed to effect this change (e.g. France); in other cases existing laws were applied to new administrative structures (Canada).

[20] This is often referred to as "environmental flows" analysis.

The modern form of 'integrated river basin management' (IRBM) includes the following important attributes:

- Water sharing amongst competing uses and users –including the needs of the environment (e.g. ecological uses)
- Water protection to ensure access for present and future generations to acceptable quality water
- Water supply to all citizens in a fair and equitable manner
- Mechanisms (formal or informal) for resolving transjurisdictional disputes.

However, how these four components of water resources management have been achieved varies greatly from country to country and must take account of all the social and cultural factors that dictate government and community values and aspirations. This applies irrespective of whether it is an international river basin or intra-national river basins.

Successful application of integrated basin management includes the following factors:

- A basin-wide institutional framework exists which is both robust and flexible, and includes modern legislation and an integrated policy framework.
- Planning and management is knowledge driven. Strategic assessment of water and related resources receives high priority, and does not stop at mere data management, but actively pursues the generation of strategically focussed information and knowledge.
- Integration is built into institutions, resource management, and policy. There is recognition of the holistic nature of ecosystems, and all policies, decisions and projects are evaluated against this background.
- Community and stakeholder participation is built into all processes. It is seen as the normal way of doing business. It recognises also that the natural resources of a country belong to its people, and they have a right to participate in its management in whatever form is appropriate for each country.
- Officials are seen as fully accountable to the public for their decisions and for enforcing the law.

Added to this list could be the financing and budgeting systems necessary to actually keep the basin initiative going, and monitoring of the organization and its programs to determine if they are achieving success in the sustainable management of the basin and in meeting public expectations. Program monitoring is important because co-ordinated management across a whole river basin causes considerable dislocation to existing institutional arrangements and discomfort to many officials who resist change. Therefore, program monitoring creates "accountability".

6.4. Institutional Options for IRBM

A basic premise in any attempt to improve IRBM in any country or basin is to adopt the simplest or easiest model or framework that will deliver the desired improvements with the least possible disruption to existing agencies or processes that are operating effectively. That is, do not adopt a complex model from elsewhere in the world because it works well in that country – it may well be contrary to the social, cultural and political aspirations of the developing country.

There is no 'one' model for a 'river basin institution' that fits all circumstances. What will work well in one country with a particular level of prosperity and social attitudes will not work in another where development pressures may be far greater. However it is possible to group "River Basin Organisations" (RBO's) generally within three categories. In this report they are called 'Council/Committee', 'Commission' and 'Authority' but each country may have different names for these. These vary from:

a) Coordinating Committee or Council

This brings together ministers or senior representatives of the agencies operating within the basin. It would meet, for example, every 6 months, to debate policies, strategies, operating principles etc and any areas of conflict that are occurring or developing. It would normally monitor the overall management of the basin in terms of assessing sustainability of resource use and allocation – that is, the 'health' of the basin's resources - and in some circumstances would monitor the performance of operating or managing agencies to ensure compliance with basin policies and strategies, but would not intrude in any day-to-day operation and management matters.

This 'model' is most commonly used in a stable or mature water environment, where population, irrigation and industry expansion are relatively small, most water projects have been constructed and management of existing resources and works is the issue. The proper data networks have been established, information is openly exchanged between the parties, and trust and confidence clearly exists. Competition for resources has largely been resolved, or systems such as water markets and transfers are in place to resolve competing uses.

Alternatively, it is used where these roles are being done, or are about to be done, by a range of other sector-based organisations and the major weakness is the lack of strong co-ordination between all the players.

The head of such a Coordination Council – must be a senior official or expert and have the confidence of the participants in the Council. Although the head has no executive or administrative authority he is effective because he/she is seen to have the confidence of senior government officials.

b) River Basin Commission

This approach is usually followed when significant development options are still an issue in the river basin, where conflicting uses are significant and where information and policies still need further development to ensure equitable sharing of resources and the impacts of resource use. It is common to use this approach where water planning and management options need considerable work – either to allow more development or to cut back on over-development - and where the simulation models, systems and the underlying data and information are not readily available, or where existing organisations are not sufficiently skilled to undertake the necessary work.

Such a "Basin Commission" would normally comprise a 'Board of Management' or group of 'Commissioners' that set policy and strategic direction supported by an expert office of water and natural resource and socio-economic planning and management experts, often drawn from existing agencies operating in the basin. There may be a group of ministers above this to provide ultimate authority.

The Commission would not interfere in river, irrigation or hydropower operations (normally left to the existing operating agencies) unless these tasks were not being done effectively or cause conflict to the overall objectives set out for the basin, or unless this was specifically included in the Commission's charter.

It would normally not intrude in general water management functions such as water extraction licensing, or waste water permits, as these would be handled by the operating agencies in each member state or province in the basin. In those cases where, by agreement, operation functions are part of the charter, it is likely that after basin management issues have "matured or stabilised", the operation functions covering irrigation and power etc, would return to provincial agencies, or in some countries, corporatised or privatised and the basin commission would then concentrate on strategic natural resource management of the rivers and catchments.

A strong feature of the 'Commission' model is that it is a real partnership between the member governments operating in the basin – usually a number of states or provinces and often the national government. Each member has equal rights and consultation and participation of all stakeholders is strongly followed. The Commission is usually sanctioned in law and has defined but limited executive and administrative power. Frequently, one of its powers is to arbitrate cases of transjurisdictional dispute. Decisions may, or may not be, binding, depending on the legal authority of the Commission. In any case, a mature legal system will deal with disputes under existing laws for those disputes that the Commission cannot deal with, or for which it does not have binding powers of decision.

c) River Basin Authority

This is usually a large, multi-disciplinary organisation that often has a very specific development task to undertake such as hydro-power development or navigation. Or it may be a powerful 'all-encompassing' organisation that virtually absorbs all water resources functions of other agencies in the basin. It usually contains both the regulation and resource management functions, although these are separated within the organisation.

Such an authority is usually established where the development tasks are large and complex and are likely to continue over many years (examples being the Tennessee Valley Authority in USA, or the Snowy Mountains Authority in Australia) or where the existing array of agencies in a basin or country are ineffective, weak and with no strategic aim or direction.

The type of model that is best for any circumstance is often a reflection of whether the basin organisation is 'new' or has been in existence for many years and has had the chance to evolve to a more mature organisation as the surrounding state or provincial agencies have also become more effective. The following table gives an indication of this 'progression' in roles of RBO's from newly created, to 'adulthood', to long term maturity.

Table 1: Functions of River Basins Organizations

Functions	New RBO	Adult RBO	Mature RBO
Group 1: Water (& natural resource) data collection & processing, systems modelling, water & natural resource planning	X	X	X
Group 2: Project feasibility, design, implementation, operation & maintenance, raising funds	X	X	
Group 3: Allocating & monitoring water shares (quality and quantity and possibly natural resource sharing), cost sharing principles		X	X
Group 4: Policy & strategy development for economic, social & environmental issues, community awareness & participation			X
Group 5: Monitoring water use & shares, monitoring pollution & environmental conditions, oversight & review role for projects promoted by RBO partners, monitoring and assessing the health of the basin's natural resources, monitoring the 'sustainability of resource management.			X

The tendency is for mature or flexible organisations or RBO's to have adopted, later in life, the functions in the Table in groups 4 and 5, and to do less, if any, of those in Group 2. Group 1 functions are basic to any form of good basin management – inadequate data, systems and models means an organisation incapable of managing water and environmental protection. However, it is common for the extent and complexity of data networks and the nature of planning to become more sophisticated as the RBO matures.

Group 2 activities are perhaps the more traditional role of RBO's in developing countries and perhaps reflect the obvious connection between regional planning and new water infrastructure. It is often the case that RBO-type arrangements in developing countries are prompted by the need to develop and operate new dams and related infrastructure. Now, more and more, these 'develop and operate' roles in the 'mature' river basins are being undertaken by corporatised (parastatal) or privatised bodies, operating under a series of operating agreements and water abstraction and pollution licenses, from the 'regulator' and 'resource manager' who may be the basin organisation.

The selection of a particular model will often depend on the strength or intensity of one or more of following three conditions (or variations of them) prevailing in a river basin;

- When rules, policies and processes for natural resource 'sharing and management' are an issue, or
- When there is a clear need for coordination and conflict resolution in transboundary basins, or
- When efficiency and effectiveness issues exist within the basin

The greater the degree of existence of all three, the more likelihood that the 'Basin Authority' model will be more relevant; if there is little contention in all three areas then a 'Coordinating Committee' may be all that is necessary.

6.5. "Command and Control" versus Consultation and Participation

It is now uncommon to create a powerful agency as in category 3 above as, in most river basins, the provincial agencies have now developed and are undertaking a reasonably effective role within their specific charters. The 'command and control' model that tends to go with the 'Basin Authority' model for basin management and for resolving disputes now is quite uncommon and there is a much greater use of 'consultation and participation' amongst the member organisations in a river basin to seek to achieve a consensus as to how to resolve a problem or to allocate and utilise resources.

An example of this is the Murray Darling Basin Commission (MDBC) in Australia. It has a high level dispute resolution mechanism that can be used if problems cannot be resolved within the Commission – a last resort 'command and control' mechanism from which there is no appeal to any decision if any member doesn't not like the decision. But in the 85 or so years that the MDBC has existed there has not been one occasion when an issue has had to be sent to the 'referee' – no doubt because everyone favours continually debating an issue to seek consensus rather than have the issue 'taken out of their hands' and then having no say on the outcome. This is a strong 'plus' for adopting some form of the participative 'Basin Commission' model. This is also the case for the Prairie Provinces Water Board in Canada for which the final arbiter of a dispute is the courts, but which has never been used in the history of the Board.

In most of the rapidly developing countries, existing state or provincial agencies and bureaus are now performing effectively and so the need often doesn't exist to take-over their functions with some 'master' basin-wide organisation. This would seem to be the case in the Chinese circumstances in which case the present River Basin Commissions are more likely to evolve more fully into the 'Basin Commission' model above rather than expand into some form of 'basin authority' covering many functions across all of the basin. In this circumstance the changing organisations will need to embrace the five attributes of good IRBM:

- A strong basin-wide institution which is supported by comprehensive and clear legislation and an integrated policy and legal framework.
- Planning and management will be knowledge driven through strategic assessment of water and related resources and interpretation of this information into clear policy and strategic direction.
- Integration is built into all operations through recognition of the holistic nature of ecosystems, and all policies, decisions and projects are evaluated against this holistic approach.
- Stakeholder participation is built into all processes so that the operation of the Commission becomes an equal partnership between the commission and the member provinces. Processes will exist for the public to have an appropriate way of participating in the management of the basin's water resources.
- Officials of the basin organization are fully accountable to the stakeholders.

6.6. Problem Solving - by the River Basin Organisations or by Provincial Agencies

If a better or more comprehensive form of river basin coordination and a more participative form of conflict resolution are to be developed in Yellow River basin – say by the adoption of one of the above RBO models – then some of the problems that could be encountered need to be considered as this can influence which approach or model is ultimately adopted.

- Conflict amongst water related functions.
  - Some functional or economic entities have their own geographical logic, which is not that of the river basin, eg, regional and metropolitan planning areas, regional development agencies, and public utilities. Will this dominant view by some make it difficult to operate a 'Coordination Committee' concept? Will a 'Commission' be a better option?
- Irreconcilable Conflicts.
  - The costs of resolving conflicts within an RBO context may be too high. Firstly, the stakes may simply be too great – some parties may have such a strong interest in persevering with a certain course of action that no feasible amount of concessions, compensation or penalty could dissuade them. This means that even if a 'Basin Commission' based on an equal partnership concept for all members is a major improvement there may still be a need to have some ultimate or superior body to resolve major disputes.

- Pre-emptive Actions by Sectional Interests
  - Faced with growing problems demanding urgent solutions, certain parties may take actions which pre-empt more optimal solutions at the river basin level. Urban authorities in the mega-cities of the developing countries are examples of this. In China, the solution of extreme water deficits in the northeast of the country would be example of pre-emptive actions by the State. Can a strong basin organisation control unwanted water resources expansion or excessive waste water pollution? In the case of pre-emptive State decisions, how should the State and the basin organization interact so that such decisions are within the planning framework of the basin organization?
- Single-problem focus.
  - Many RBO's of the past have really had a single issue focus – flood control, food production (irrigation) or hydropower generation. It may do an excellent job within this discipline but other legitimate river basin functions will be neglected or sub-optimised.

    Establishing the potential claims of the different water uses (domestic supply, irrigation, hydropower etc) and assessing the ability of the basin's natural resources to meet them should be the first step in a strategic basin management plan. Any basin organisation that aims to better manage resource utilisation and environmental management must have these strategic roles.
- Unsuitable Scale
  - In some cases, the river basin is too large a geographical unit to be administratively feasible. It may be more feasible to concentrate on the individual tributary sub-basins and sections or reaches of the main river and develop some form of coordinating mechanism that meets as required for basin wide issues. This may well be the case for some of China's large river basins. An example of sub-basin management is the Fenhe River basin of Shanxi Province.
- Information and Knowledge Generation
  - Natural resource data networks are notoriously one of the most difficult areas in the water sector to fund at an adequate level although this seems not be a serious problem in China. It is not only the natural resource data that suffers from lack of funding, but all forms of water use and efficiency statistics as well. In China it is long recognized that efficiency of monitoring is low due to competitive monitoring programs of two ministries and lack of sharing of data.
- Failure to Involve the Basin Stakeholders – From Provinces down to Villages.
  - Engineers and water professionals have not been good in incorporating the needs and aspirations of all levels of the basin community or stakeholders in regards to river basin management. This is a key issue in solving or preventing water related disputes at all levels but particularly at the lower administrative levels in a basin. An effective basin organisation in the Yellow River needs to create and implement water related awareness programs and an appropriate form of consultative and participative arrangement to ensure the broader views of the community are heard.

To summarise, the major problems affecting good transjurisdictional management within an integrated river basin management framework, and the effectiveness of an RBO – whether this is for an entire basin or for sub-basins covered by parts of two or more provinces - can be attributed to:

- *Conflicts in the power and roles of existing administrative units and regions (or countries in the international sense)*
- *The lack of quality data, data integration, scientific information, and models upon which to develop sound knowledge and policies, all contribute to inhibiting the development of trust and confidence amongst the stakeholders*
- *The size of the river basin may be too large and may become unmanageable; it may be better to consider sub-basin coordinating mechanisms*
- *Giving the RBO a single project-driven focus and allowing it to move into centralised planning and social issues that rightfully belong with other organizations*
- *Failure to raise the level of awareness of the basin community and failure to meaningfully involve them in water planning and management decisions.*

6.7. Transjurisdictional Pollution Management

In addition to basin-scale management, international experience in transjurisdictional water management leads to the following general observations about water pollution issues:

- There must be a clear definition in law, or administrative practice, of what constitutes a pollution infraction. This may be defined in waste discharge laws that, when enforced, greatly reduce the potential for transjurisdictional pollution problems. Alternatively (or in parallel, as is the case in Canada and Australia), the basin authority establishes boundary water quality criteria that, if exceeded, triggers some form of administrative action.
- Dispute settlement mechanisms are defined. In all international and most intra-national cases, these mechanisms are consultative and most commonly lead to administrative decisions that are fully implemented by the parties to the agreement.
- Redress through the courts is not common for transjurisdictional water pollution issues due to the culture of negotiated settlement that is common in most western countries. The courts are used mainly in issues where there is inconsistency in the law (interpreting the law), where the establishment of legal liability is beyond the competency of the RBO, or where arbitration of the terms of a settlement is required.
- Transparency in administrative processes and involvement of the public reduces the risk of inappropriate actions by government officials and a wider public acceptance of administrative decisions.
- Local actions must conform to basin-wide interests.
- Accountability of Government Officials: Officials are held accountable by the public for their actions through a variety of mechanisms, including program monitoring and reporting by an independent third party, public consultation, open access to environmental data, the right of public access to information, and mechanisms in many governments for independent reporting of government effectiveness and efficiency (audit function).

- Accountability of Ministries: The public is guaranteed the right to sue, through the courts, government agencies for failing to enforce the law. In some countries, such as Canada, one ministry may sue another ministry if the other ministry is found to be polluting.
- Companies that are owned by the government (in Canada these are "Crown Corporations", or 'State Owned Corporations (SOC's) in Australia) are subject to all laws and are subject to the same penalties as for private sector companies.

6.8. Summary and Recommendations

The basin agency should be entrusted only with those functions that it can perform better, more effectively and efficiently and in a more sustainable way than any other institutional agency in a country or across a basin. It is also essential that it be knowledge-based, be flexible in its approach and involve in an appropriate manner the key basin stakeholders or community in the most meaningful way. This can be summarized in four key functions for a successful basin agency:

- A water sharing and natural resource (or environmental) planning and management role that individual members or stakeholders (ie states, provinces, prefectures etc) cannot perform individually due to complexity or conflict of interest
- A coordination and conflict resolution role in transboundary basins
- An operational role that is necessary to improve efficiency and effectiveness over selected development projects
- Monitoring and assessment of the sustainable use of resources and the on-going 'health' of the basin's natural resources.

> ***In general, the simplest, most efficient basin co-ordination mechanism that will do the job should be adopted***.

We have not been asked to make specific recommendations concerning the appropriate river basin organization for the Yellow River, however, we draw the following conclusions:

a) A specific law for the Yellow River is retrogressive; it is counter both to modern river basin management experience and to the general direction of institutional reform in China.

b) Enabling legislation at the national level, that permits the development of modern, stakeholder-oriented river basin organizations, would be desirable.

c) In modern river basin organizations it is no longer necessary for the RBO to be dominated by a single ministry. RBO's operate under the rules and oversight of the responsible ministries, but are independent legal entities having responsibilities both to their constituencies and to national ministries.

7. LEGISLATIVE CASE STUDY: REGULATIONS ON WATER POLLUTION PREVENTION AND CONTROL OF THE FEN RIVER BASIN (THE FEN RIVER REGULATIONS)[21]

Water pollution in the Fen River Basin is primarily a transjurisdictional problem requiring integrated effort of cities, counties and prefectures within the Basin.

7.1. Introduction

7.1.1. Background and Rationale

A major output of this TA project is the development of a "model" river basin legislative framework for transjurisdictional water pollution management and control. This is a parallel activity to the task of recommending changes to national legislation (mainly the WPPC Law) for transjurisdictional water pollution management and control. The choice of the Fen River for this legislative case study reflected (1) the existence of basin legislation, and (2) the willingness of local officials to work with us in the development of the case study. These conditions were met in Shanxi Province where local officials worked closely with the project consultants to achieve the desired outcome. The success of this project is partly measured by the fact that the Shanxi EPB, as a result of this TA project, have proposed further amendments to the Fen River Regulations. The "model" framework extends the proposed amendments insofar as it (1) considers aspects that are not, as yet, included within the national legislative framework (e.g. dispute settlement mechanism), (2) institutional arrangements that are not within the current working arrangements between MWR and SEPA, and (3) an accountability regime that is outside current regulations.

7.1.2. The Fen River Basin

The Fen River is the longest river in the semi-arid Shanxi Province and the second longest tributary of the Yellow River System. It runs from north to south through 39 counties and 6 cities including Yizhou, Taiyuan, Jinzhong, Liuliang, Linfen and Yuncheng, and empties into the Yellow River in Wanrong County in Yuncheng Area. The river is 710 kilometre long and accounts for 25% of the area of the whole province of Shanxi. The GDP of the Fen River Basin is some 60% of the entire Province. Forty-one percent of the provincial population is located in the Fen River basin. Shanxi Province has abundant coal deposits and was early identified as an energy source in China. This, plus the overall industrial development has contributed to profound water shortages and water pollution in Shanxi Province.

[21] This chapter is taken from the "Research Report on the Regulations concerning the Water Pollution Prevention and Control of the Fen River Basin (the Fen River Regulations)" by Cai Shouqiu & Li Guangbing, undertaken as part of this TA project. It presents the full background and results of the extensive collaboration with officials from Shanxi Province. The text of this chapter contains a number of minor revisions that are not included in the consultants original report but which are made here to be consistent with the project recommendations for changes in the national legislative framework.

Hydrologic Characteristics of the Fen River:

- Total water resources of the Fen River is 3.36 billion m3.
- River flow relies primarily on rainfall that dominates the natural flow regime. Flow in dry seasons only accounts for 1/8 of the average annual flow and, in some reaches accounts for 1/500.
- Because of interception of reservoirs, the natural flow of upstream sections is noticeably smaller than middle stream and lower stream sections, only accounting for 2-5%.
- In dry seasons almost all the flow is waste water flow. The river sections of the middle stream and upstream of the Fen River basically do not have any assimilation capacity, and the assimilation capacity of downstream sections is also extremely limited.
- Nearly 80% of the flow of the Fen River is used for agricultural irrigation.

Utilization of the Water Resources of the Fen River:

- Nearly 80% of the river flow is used for agricultural irrigation.
- Groundwater is primarily used for industrial and domestic uses. The exploitation of underground water accounts for 50-60% of the whole water supply, and up to 80% in upstream and middle stream areas.
- Water use continues to increase, following economic development plans. This includes water intakes for industrial and domestic use as well as for recreational use, urban water parks, aquaculture and agriculture.
- The river reach from the Fen River source to the Fen Reservoir is a natural waterway used by the Yellow River Water Diversion Project that, in 2002, began to augment water supply in the Fen River basin.

7.1.3. Water Pollution of the Fen River Basin

The waste discharge total of the Fen River Basin is around 288.33 million tons of which 47.2% was industrial discharge and 52.8% was municipal. The total of COD is some 112,521 tons - 31.5% from industry and 68.5% from domestic wastewater. The discharge of NH3-N is 13,642 tons, 28.1% of which comes from industry and 71.9% from domestic wastewater. The major discharge areas are located in middle stream and upstream areas, and accounts for some 60-70% of the discharge total. The major polluting industries include metallurgy and chemical industries. The waste water discharge total and the discharge total of major pollutants of these two industry groups account for more than 50-60% of the total of all industrial pollution within the basin.

7.1.4. Water Pollution Prevention and Management of the Fen River Basin

Before 1900, water environment management of the Fen River Basin primarily relied on the Environment Protection Law, the WPPC Law, the Discharge Standard of Three Varieties of Industrial Waste, the Surface Water Environment Quality Standards GB3838-88, the provisions concerning discharge standards of some relevant industries, the three environment

management systems including the charging system of waste discharge, the environment impact assessment system of construction projects and the "three simultaneity system[22]", as well as other relevant policies. There was no local legislation or implementing rules that built on national legislation for water environment management. Environment protection departments mainly focused their work on control of major industrial pollution sources.

As a consequence, the Shanxi Provincial Government developed the Fen River Regulations which came into effect in 1989 and which were subsequently revised in 1997. This became the major basis for water pollution prevention and control of the Fen River Basin. The Shanxi Provincial Government amended the Water Pollution Prevention and Control Plan of the Fen River Basin, developed standards for delineation of water function zones of Shanxi Province, and developed an Implementing Scheme for Water Pollution Prevention and Control of the Fen River Basin (1995). The provincial government also incorporated the water quality improvement of the Fen River into social development plans, taking the water pollution control of the Fen River as a major task of the environment protection work of the whole province.

7.2. Major Contents of the Fen River Regulations (1997)

7.2.1. Scope of Regulations

These regulations are applicable to the prevention and control of pollution of both the surface water bodies and underground water bodies of the mainstreams, tributaries, wellsprings, lakes, reservoirs, canals, wells, etc within the territory of the Fen River Basin. They are enacted for the purpose of preventing water pollution within the territory of the Fen River Basin, and for protecting and improving the ecologic environment.

7.2.2. Guidelines and Principles for Water Pollution Prevention and Control

- Focus on pollution prevention combined with pollution elimination and comprehensive pollution control;
- Overall planning with deGraded responsibilities and sectional management
- Polluters pay;
- Principle of bringing discharge into conformity with standards.

7.2.3. Supervision and Management Mechanisms

The Environment protection departments are responsible for integrated supervision and management of the water pollution of the Fen River Basin. These duties are consistent with national legislation.

[22] This refers to the design, construction and operation of environmental facilities, such as a wastewater treatment plant, and that will be carried out simultaneously with the construction of the main project. This is one of the most important environmental policies in PRC.

- Develop long-range and annual water pollution prevention and control plans with joint efforts of other government agencies and supervise their implementation.
- Review and approve environment impact assessment statements and other statements, and inspect the implementation of the "three simultaneity system" with joint efforts of other government agencies.
- Review and approve pollution elimination and control projects with joint efforts of other government agencies, participate in the checking and acceptance of projects at completion, and supervise the pollution elimination of polluters.
- Organize for water environment monitoring, keep informed of the water environment situation and development trend of the area and recommend measures for improvement.
- With joint efforts of other government agencies, organize for water environment research, carry out legal education for water environment protection, and promote advanced experiences and technologies for water pollution control.
- Investigate and deal with water pollution disputes and accidents.

Other departments of government within the province are responsible for conducting water pollution prevention and control in accordance with their own responsibilities and roles, and carrying out supervision and management of the water pollution prevention and control of the Fen River Basin in cooperation with environment protection departments. Water resource departments are responsible for approving the application for establishing discharge outfalls within water conservancy projects including canals and reservoirs.

7.2.4. Major Management Systems and Measures

The pollution control systems and measures developed in the Fen River Regulations are mainly a reproduction of the WPPC Law (1996). Water pollution prevention and control plans are developed first, then standards are set down, and finally all polluters are required to meet standards. New pollution sources are controlled through environmental impact assessment and the "Three Simultaneity System". Existing pollution sources are controlled through the systems of waste discharge permitting, environmental monitoring, charging for excessive waste discharge, and pollution elimination with a time limit. Pollution sources that have created pollution accidents can be subject to compulsory measures.

Detailed provisions concerning load control and permitting, prescribed in the WPPC Law, are not included in Fen River Regulations. These regulations only authorize provincial environmental protection departments to develop detailed measures.

7.2.5. Transjurisdictional Management of the Fen River Basin

There is little in the Fen River Regulations that deals specifically with transjurisdictional water pollution management.

7.3. Assessment of Efficacy of the Fen River Regulations

7.3.1. Social Effects

Since its promulgation on July 1989, the Fen River Regulations have played an active role in the implementation of various water environment management systems, has strengthened pollution prevention and control of the Fen River, and has had some positive impact in dealing with the increasing pollution of the Fen River.

Firstly, it has provided a comprehensive, legal basis for pollution control. In addition to provincial level planning, standards, water function zones, etc., various levels of local governments have also developed local plans and legal documents concerning the plans and implementing rules for water pollution prevention and control within the boundary of their jurisdictions.

Secondly, the promulgation and implementation of the Fen River Regulations has compelled enterprises to adopt more advanced technologies and management measures to strengthen water pollution prevention and control, and to reduce waste discharge to alleviate polluting pressure upon the Fen River.

Thirdly, the promulgation of the Fen River Regulations has strengthened the sense of responsibility and sense of pressure on governments and environment protection departments, and promoted the enthusiasm of governments for water pollution management of the Fen River Basin. Water pollution management targets and tasks have been incorporated into the assessment of government agencies' achievements. 80% of the 190 pollution control projects set by the Implementing Scheme have been completed through joint efforts of various levels of governments, environment protection departments and polluting enterprises. Some important environment management systems including load control, waste discharge declaration, waste discharge permitting and elimination of pollution with a time limit have been implemented or adopted for experimentation first in the Fen River Basin.

7.3.2. Environment Effects

After the implementation of the Fen River Regulations, Shanxi Provincial Government developed an implementing scheme for Water Pollution Prevention and Control of the Fen River Basin, which prescribed targets for water pollution prevention and control of the Fen River for the period 1998-2000. The following summarizes the major outcomes:

- For the most upstream source area, the control target was to reach the water quality standard for Category 3 Water set by the Surface Water Environment Quality Standards. By 2000, the standard was reached basically, however, the concentration for petroleum substances still exceeded the standard.
- For the upstream section, the target was to reach the standard for Category 4 water. In 2000, the water quality reached the standard for Category 4 water.

- For the middle stream section, the target was to achieve conspicuous improvement on water quality. Compared with the water quality of 1997, in 2000 contents of COD and NH3-N was noticeably higher and water quality continued to deteriorate.
- For the downstream section, the target was to reach the standard for vegetable-irrigation water prescribed in the Water Quality Standard for Agriculture Irrigation, in 2000 the water quality failed to reach this target.

7.3.3. Existing Problems and Causes

1. The Implementing Scheme for the Water Pollution Prevention and Control of the Fen River Basin failed to be implemented completely and the planned targets failed to be attained.

Some government officials and executive officers of enterprises have little sense of sustainable development, emphasizing only economic efficiencies while attaching no importance to environmental efficiency, and failed to implement in accordance with planned targets and schemes. This is one of the major reasons for the incomplete implementation of the Fen River Regulations.

Environment protection departments failed to enforce laws and regulations on a rigid basis, failed to inspect and supervise the implementation of their request upon enterprises for control of existing pollution sources with high consumption of water and serious pollution to environment. The absence of complete implementation of some managerial measures including load control and waste discharge permitting also contributed to incomplete implementation.

2. Control of domestic pollution sources has not received sufficient attention

In the Fen River Basin, waste discharge and pollution from urban wastewater has been increasing for many years, and the discharge total now exceeds that of industry. However the focus of pollution prevention and control has been only on industrial control with insufficient attention to the control of domestic pollution sources. In the 40 cities and towns in the Fen River Basin, more than 30 have not established facilities for treatment of domestic sewage, so that 80% of domestic sewage is discharged directly into the Fen River without treatment.

3. Low rate of water recycling with serious water waste

The notion of ecological economy is not well understood, therefore, little attention has been put into technologies to minimize water consumption, or on the integration of pollution control and water re-use. Consequently there is excessive consumption of fresh water together with enormous discharge of wastewater, resulting in water wastage and excessive water pollution.

4. Pollution of underground water is neither clearly defined nor is effectively controlled

The water supply for industry and domestic use in the Fen River Basin primarily relies on groundwater. For many years' serious pollution of the Fen River has already impacted underground water quality to some extent. It has been found that some indexes for groundwater do not reach the standards for drinking water, however, there is a lack of complete investigation and research on extent, areas, scopes and depth of groundwater pollution. Although the Fen River Regulations do prescribe for protection of groundwater the

provisions are not scientifically based and have no implementing measures. Consequently, therefore, no substantial measures have been taken on groundwater pollution control.

5. Lack of funds and technologies

Shanxi Province is an economically disadvantaged province without the resources to quickly improve treatment facilities or to implement more advanced industrial technologies.

7.3.4. The Role of the Fen River Regulations on the Aspect of Transjurisdictional Water Environment Management

The Fen River Regulations, while articulating certain principles that can apply to transjurisdictional water pollution management, have no specific implementing measures. There is no content that deals with transjurisdictional pollution accidents.

7.4. General Recommendations

To improve the pollution situation in the Fen River, to better integrate the Fen River Regulations with national legislation, and to make the Fen River Regulations more operational, we recommend amending the Fen River Regulations taking into account the following general concerns.

1. More emphasis should be put on comprehensive management, and the responsibilities and duties of relevant government agencies should be defined to combine responsibilities, power and interests together, including the use of the senior coordinating committee to implement the regulations and to create accountability.
2. To bring the Fen River Regulations in conformity with the latest laws, regulations, standards and policies. Implementing details for national standards and local standards should be defined further in the Fen River Regulations.
3. Further emphasize the integrity amongst pollution control and urban construction, ecological protection and the utilization of sewage. Stress should be put on treatment of domestic sewage, and pollution prevention and control can be developed as an industry as has been the case in western countries.
4. Develop systems of total load control and waste discharge permitting, and reform the charging system for waste discharge. Enterprises may conduct pollution trading under appropriate rules.
5. The Fen River Basin should be considered as a whole; the interests of upstream, middle stream and downstream areas should be coordinated and social, economic and ecologic efficiency should be combined together. This should be reflected in water function zones.
6. Develop a reporting system for water pollution and for settlement measures for pollution disputes.
7. Include comprehensive basin-wide planning, including pollution targets, control options, implementations schedules, and water reuse.

8. Enhance data sharing, uniform and transparent access to data by the public and by other agencies, and legal use of data of one jurisdiction by another in cases of disputes and emergencies.

7.5. Amending the 1997 Fen River Regulations

7.5.1. General Introduction on Amendment

The Environment Situation Communiqué of Shanxi Province for 2001 showed that only one section of the 21 monitored sections in the Fen River Basin met standards for Category 2 and Category 3 Water. Sixteen sections were worse than Category 5 water and accounted for 76.2% of the monitored sections. This indicated that the 1997 amendment of the Fen River Regulations still could not satisfy the needs for water pollution prevention and control of the Fen River. There are many reasons for this, but one of the main reasons is the lack of a comprehensive transjurisdictional planning and implementation framework. This is a key issue insofar as the problem of the water pollution control of the Fen River Basin is primarily a transjurisdictional one which requires integrated efforts of various cities, counties and prefectures within the Fen River Basin.

Therefore, the Environment and Resource Protection Committee of Shanxi PPC together with Shanxi Provincial EPB planned to revise the Fen River Regulations once more. Based on the proposal of the Environment and Resource Protection Committee of NPC, the ADB TA Project Team decided to choose the Fen River Regulations as the object for a legislative case study. After joint research conducted by Shanxi EPB and the Project Team, the Shanxi EPB drafted the amendment of the Fen River Regulations in June 2002. On the basis of the EPB draft amendments, the project legal team subsequently put forward the consultants' version of draft amendment combining the international and domestic consultants' recommendations with the comments of the representatives from the 9 riparian provinces brought forward in the Drafting Seminar of Water Pollution Management Legislation held from Nov 25 to Nov 29. This outcome is the "model" legislative framework for river basin management.

7.5.2. Basic Principles

As a local legislation on environmental protection, the Fen River Regulations should demonstrate the basic principles for environmental protection, such as the principle of coordinated development of environmental protection and economic and social development, the principle of sustainable development, the principle of polluters pay, etc. Meanwhile, the following principles should embody the characteristics of the Fen River Basin.

a) Integrated, comprehensive planning and comprehensive management (integrated management)
   Integrated planning means that a scientific comprehensive plan of the whole basin should be developed, integrating water resource development and utilization with water resource protection, integrating water pollution control plan with water resource protection plan,

integrating water pollution control with ecological restoration, and integrating urbanization and industrialization with ecological protection.

b) Pollution prevention and control

c) Priority to environmental protection and ecology

d) Equitable development and utilization of water resources amongst various administrative areas

e) Comprehensive and optimum use of water resources

f) Transparency in water pollution policies, laws, regulations, and administrative affairs of basins

g) Environment democracy and public involvement

h) Equal undertaking of responsibilities for water pollution prevention and control among various administrative jurisdictions

i) Cooperation among various administrative areas within a basin

j) Prevention and timely settlement of transjurisdictional water pollution accidents.

k) Data sharing, uniform and transparent access to data by the public and by other agencies, and legal use of data of one jurisdiction by another in cases of disputes and emergencies.

7.5.3. Key Points for the Amendment

The following problems are key issues in any amendment of the Fen River Regulations:

1. How to take an integrated and total control approach to strengthen water pollution elimination and control of the Fen River Basin.
2. How to deal with transjurisdictional water pollution management by strengthening the development of managerial measures and systems, to define relevant legal responsibilities, and to ensure accountability of officials in implementing the regulations.
3. How to develop water pollution managerial mechanisms that are practical under the situation of the Fen River Basin, especially in regards to institutional development such as the establishment of a coordinating institution of the Fen River Basin (the Fen River Basin Managerial Committee) to deal with integrated coordination for water pollution control.
4. How to combine water pollution prevention and control plans with water resource protection plans of the Fen River Basin.
5. How to develop a mechanism for environment resources compensation including the economic compensation between upstream and downstream areas.
6. How to develop a mechanism for settlement of transjurisdictional water pollution accidents, incidents and disputes.
7. How to develop and implement monitoring and review mechanism for implementation of the basin plan.
8. How to develop appropriate data sharing and data transparency.

7.5.4. Major Revisions

7.5.4.1. Objectives

The existing Fen River Regulations establishes on general objectives, without specific objectives concerning water pollution control. It is recommended that the Amendment should include specific objectives for water pollution control. Specific objectives should include short-range objectives (e.g. for 10 years) and long-range objectives (e.g. for 25+ years). A Short-range objective could be to achieve the water quality standard for Category 3, while a long-range objective might be to achieve some ecological condition and to ensure that water flows in all seasons in the Fen River.

Specific objectives should be set only after completion of overall investigation, comprehensive assessment, economic analysis, environment assessment and extensive public hearings so that the public understand the actions needed, the costs involved, and objectives to be reached.

7.5.4.2. Managerial mechanisms: institutions and their responsibilities and functions

1. Current situation

The managerial mechanisms prescribed in the existing Fen River Regulations are the same as those prescribed in relevant national legislations, namely integrated supervision and management combined with sectoral supervision and management.

This kind of managerial mechanism is still based upon the managerial units of areas and government agencies, rather than upon the managerial unit of river basins. Although it is prescribed in the Fen River Regulations that environment protection departments shall be responsible for “integrated supervision and management”, the definition of “integrated supervision and management” is not clear, and how to exercise this power is also not clear. Relevant practice has proved that this kind of mechanism is not sufficiently efficient and effective to carry out basin environment management.

2. Recommendations for amendment

An integrated managerial mechanism with the leadership of the Provincial Government should be developed. The responsibilities, functions and power limits of various levels of governments and government agencies are as follows:

- The Water Pollution Prevention and Control Committee of the Fen River Basin should be established with responsibility for integrated coordination of the water pollution control work of the Fen River Basin. The committee should be chaired by the leaders of the Provincial Government, comprised of various administrative departments including the departments of environment protection, planning, water resource, land and resources, construction and agriculture. The Committee should be responsible for coordinating for the water pollution prevention and control of the Fen River Basin, developing managerial systems for transjurisdictional water pollution control, resolving transjurisdictional water pollution accidents, etc.

- Promulgate water pollution prevention and control plans of the Fen River Basin, containing general and specific objectives, and environmental targets, for water pollution prevention and control.
- Develop accountability systems for water environment quality in accordance with the targets and incorporate these into the annual assessment of achievements of responsible officials of various levels of local governments.
- Report to PPC on the progress made upon the water pollution prevention and control of the Fen River Basin and upon the reach of water pollution control targets on a regular basis.

Responsibilities and functions of various levels of local governments:

- Responsible for the water environment quality of the reaches within the boundaries of their jurisdictions, and ensure that the water quality of the sections at transboundary areas with downstream administrative areas are in conformity with prescribed standards.
- Develop water pollution prevention and control plans for the areas within the boundary of their jurisdictions; expressly prescribe targets to be attained and measures to be adopted.

Responsibilities and functions of the provincial environment protection department:

- Delineate water environment function zones in harmony with the delineation of water function zones of water resource departments.
- Develop the water pollution prevention and control plans and total load control plans for major pollutants in accordance with the delineation of water environment function zones.
- Establish a monitoring network in harmony with the water resources department for the whole river basin; generate information on water quality trends through time relative to development in the basin. This information should be reported to the Provincial Government, the Water Pollution Prevention and Control Committee and the public on a regular basis.
- Approve pollution control projects and supervise waste discharge of pollution sources.
- Investigate into and deal with water pollution accidents, water pollution disputes, etc.
- Supervise the affairs of lower level environment protection organizations to ensure that objectives are achieved and, if not, to determine actions to be imposed at the lower level.

Responsibilities and functions of the provincial water resource department:

- To be responsible for the development and utilization of water resources, and take into account the need of basic ecologic runoff for different reaches.
- Develop general plans for water resource development and utilization of the Fen River Basin.
- Delineate water function zones, assimilation capacity and allowable total pollution load that meets the requirements of the water function zones of the Fen River Basin and to coordinate these with pollution control plans.

- To be responsible for approval of building outlets within river course or water conservancy projects.
- To participate in the network of monitoring for basin water environment.
- To participate in resolving disputes and accidents concerning water pollution, etc.

Other government agencies should cooperate with and assist the environment protection department and the water resource department on water pollution and water resources management according to their particular responsibilities and functions. Comprehensive economic management department should be responsible for developing Catalogues of Production Techniques and Equipment to Be Eliminated with defined time limits, to promote cleaner production. The Construction Department should be responsible for the instalment of drains, and the construction and operation of sewage treatment plants in cities and towns.

7.5.4.3. Water Pollution Prevention and Control Plans of the Fen River Basin

1. Existing provisions

Article 7: The environment protection departments of various provincial governments shall develop and supervise the implementation of long-range and annual plans for the water pollution prevention and control of the areas within the boundary of their jurisdictions, with joint efforts of other relevant departments.

This provision is too general. Firstly, it does not reflect the principle of integrated management of the Basin. Secondly, it does not reflect the requirement to link water pollution prevention and control plans with water resource development and utilization plans. Thirdly, it fails to prescribe any procedure for achieving this plan.

2. Recommendations for amendment:

- It should be expressly prescribed that the development of water pollution prevention and control plans (the Plan) shall conform with the principle of integrated water resource planning and management.
- The relationship between water pollution prevention and control plans and water resource development and utilization plans must be defined. Water pollution prevention and control plans fall into the category of special plans prescribed in the Water Law, and should be coordinated with water resource comprehensive utilization plans and water resource protection plans. Therefore we recommend that the water pollution prevention and control plan prescribed in the WPPC Law and the water resource protection plan prescribed in the Water Law be merged into one single plan called the “Water Pollution Control and Water Resource Protection Plan”, which is to be developed **jointly** by a working group established by the provincial environment protection department and the water resources department with joint effort of other relevant departments, and mainly address water pollution prevention and control, prevention of soil erosion, protection and use of water resources, and protection of water ecologic systems and aquatics.
- The procedures for development of the water pollution control and water resource protection plan should be expressly prescribed in the Fen River Regulations. The

provincial environment protection department and the water resources department should be **jointly** responsible for the plan, for submitting it to the Committee for the Water Pollution Prevention and Control of the Fen River Basin for discussion and review, for consultation with other relevant departments of planning, water resource, urban construction and agriculture for comments, and for publicizing the draft plan to the various levels of local governments, enterprises, organizations and the public within the Fen River Basin for hearing of opinions. The Committee for the Water Pollution Prevention and Control of the Fen River Basin should revise the plan in accordance with the above-mentioned responses, and then submit the revised and adopted plan to the Provincial Government for approval, promulgation and implementation.

- The Fen River Regulations should prescribe a timetable for the development and amendment of the plan.
- Various levels of local governments should develop local implementing plans for water pollution control and water resource protection within a specified timeframe in accordance with the basin level plan. As for those that have failed to develop local implementing plans within a prescribed period, and those whose plans have failed to be approved, the provincial environment protection department may develop implementing plans for them directly and order the relevant governments to comply.

7.5.4.4. Transjurisdictional water pollution prevention and control

1. Existing provisions

There are no specific provisions for transjurisdictional water pollution management. There are a number of reasons why this is the case, including:

- The Fen River is widely regarded as a sewer. Therefore, there is little thought to other potential functions or benefits that would require transjurisdictional management.
- The concept of integrated management of the whole basin is lacking. Existing environment management is mainly focused on point source pollution control based on delineation of management zones and discharge criteria. Because there are no pollution control targets for the whole basin, various administrative areas have little reason for direct contact with each other except when there are pollution accidents.
- The division of responsibilities and linkages amongst various departments and administrative jurisdictions are not clearly defined. Therefore, local governments make unlimited use of environment assimilation capacity without regard to downstream requirements.

2. Recommendations for revision

- The provincial water resource department should distribute the water resources of the Fen River Basin rationally and clearly.
- The provincial EPB should check and verify the waste discharge load and reduction amount of waste discharge for various administrative areas, in accordance with the waste discharge total identified by the provincial water resource department.

- The provincial EPB should establish monitoring stations at transjurisdictional water sections of the Fen River Basin, and identify the water environment quality standards applicable to them.
- Upstream governments should be held responsible for the water quality of transjurisdictional water sections. The governments of the areas, where water quality of key monitored sections do not meet targets should be subject to administrative penalties.
- If incoming water quality fails to meet standards and cause difficulties for downstream governments, the downstream jurisdiction has the right to request pollution abatement actions and, if necessary, economic compensation from upstream jurisdictions.
- Transjurisdictional water pollution disputes should be subject to settlement through a defined process of dispute settlement. This is described in the "model" legislation and, more specifically, in our recommendations for revision to the WPPC Law.

7.5.4.5. Information collection and dissemination

1. Prescriptions in existing legislations

Currently information collection for law enforcement is prescribed through four ways, including self-declaration, monitoring, impeachment and inspection. Information collection focuses on waste discharge and control of pollution sources, as well as water quality conditions of the river basin. There is no information on water environment quality for transjurisdictional sections. There remain problems in sharing of information between environment and water resource departments, and there is little data dissemination except as water quality summaries. Consequently, there is little ability to carry out integrated basin management or to seek public involvement in management of the basin.

2. Recommendations for revision

- The provincial EPB should be responsible for monitoring the water environment quality of transjurisdictional sections, gathering information concerning water quality of the whole basin, and reporting to the committee for the water pollution prevention and control of the Fen River Basin under the Provincial Government on a regular basis.
- EPBs should publicize water environment quality conditions to the public on a regular basis.
- Develop a system of water environment impact reporting. If projects likely to affect downstream areas are to be constructed, or when there is the occurrence of water pollution accidents likely to affect downstream areas, the downstream EPBs should be notified.
- A system of information sharing should be developed between EPBs and water resource departments.
- Various levels of governments should report to the people's congress of the same level about the implementation of water pollution management plans.
- A transparent system for public access to information should be developed.

7.5.4.6. Other issues

1. Environmental Flows

For much of the year there is no natural flow in much of the Fen River which is comprised mainly of wastewater. A major task will be to evaluate what ecological condition should be developed at various parts of the river and how these can be realistically be achieved. Wastewater load control is one method, however other methodologies such as flow augmentation, wastewater diversions, etc., will be required.

2. Prescriptions concerning prevention and control zones

In the "model" legislation, Article 16, 17 and 18 of the existing Fen River Regulations have been deleted. One of the reasons is that Shanxi Province has already developed local standards of "delineation of water function zones", which have identified the water functions of various reaches of the Fen River and have covered the contents concerning prevention and control zones in the Fen River Regulations. Secondly, the National Standard concerning Surface Water Quality and the waste discharge standards of some industries has already been revised. Thirdly, some relevant national legislation has already been revised.

3. Carry out load control systems and waste discharge permitting systems on a complete basis

Except in rainy seasons, there is almost no natural flow at all in the Fen River, and most of time the river is a sewage channel. Attainment of environment quality standards for this river is unrealistic under this condition. Focus must be given to reducing wastewater volume in general, and on pollutant load control. Therefore, a waste discharge permitting system is a necessary action.

4. Reform the waste discharge fee systems

The current waste discharge fee system for exceeding wastewater standards should be reformed into one that charges on the basis of waste discharge volume. Excessive waste discharge should be subject to administrative punishment.

Pollution trading systems should be evaluated for use in the Fen River basin. This, plus the discharge fee systems can expedite the process of sewage treatment and promote water environment improvement in the Fen River Basin.

7.6. Model Basin Legislation

The Fen River lies wholly within Shanxi Province. The Articles of the model legislation reflect, therefore, intra-provincial transjurisdictional issues. Elsewhere in this report we provide recommendations for inter-provincial transjurisdictional water pollution management as part of the overall recommendations for revision of national legislation. The EPB proposed amendment of 2002 and the 1997 Amendment of the Fen River Regulations are contained in the consultants' report noted in Footnote #1. The model legislation is presented below, together with annotations (in italics) that provide the reason for having each article.

"Schedules" that are normally attached to the regulations are provided below. Schedules build on the text of the Articles in the legislation, but provide more detail on specific activities, roles, interactions, and functions, than are possible within the Articles. The Schedules are, however, part of the Regulations. In a sense, the Schedules play the same role as implementing rules.

7.6.1. Regulations on the Prevention and Control of Water Pollution in the Fen River Basin in Shanxi Province ("Fen River Regulations")

Article 1: *These regulations are enacted for the purpose of preventing water pollution within the territory of the Fen River Basin, protecting and improving ecologic environment, in accordance with the provisions of the WPPC Law, the Water Law and other relevant laws, and on the basis of the real situation and practice of Shanxi Province.*

This article states what the regulations are for and what the planning and management actions taken by various agencies are meant to achieve. This represents the broad scope of what can be done under the regulations and is important if individuals, groups or enterprises want to challenge the legality of some action taken by the supervising or managing agencies – are the actions being taken within the broad meaning of the regulations?

Article 2: *These regulations shall be applied to the areas with tributaries connected to the mainstream of the Fen River including the Yizhou City, Taiyuan City, Luliang City, Jinzhong City, Linfen City and Yuncheng Prefecture within the Fen River Basin.*

These regulations shall be applied to the prevention and control of pollution of both the surface water bodies and underground water bodies including rivers, wellsprings, reservoirs and canals, within the boundary of the Fen River Basin.

This article defines what geographic area the regulations cover (that is, the whole of the catchment or drainage area of the Fen river basin) as well as specifying what type of water resources can be covered. If a dispute arose as to whether a particular area was in, or outside, the Fen river basin, technical data would need to be obtained to precisely define just where the catchment boundary is located.

Article 3: *The "Water pollution" mentioned in the Regulations refers to the phenomenon that the change of water bodies' chemical, physical, biological or radioactive characteristics affects effective utilization of water, endangers human health, jeopardizes ecologic environment and causes aggravation of water quality. Water pollution occurs when water quality does not conform to the standards established under the water environment function zone.*

The Regulations deal with water pollution under three categories:

1. *Pollution Accident: This results from a short-term, unplanned, accidental situation which cannot be predicted and is beyond the ability of authorities to control.*
2. *Pollution Incident: This refers to a short-term pollution situation arising from a man-made cause such as illegal release of wastewater.*
3. *Pollution Condition: This refers to the long-term, ambient conditions that exist in surface or ground waters, arising from the cumulative impact of effluents and runoff from non-point sources.*

This article defines what is meant be 'water pollution' and also by an 'accident', 'incident' or 'condition'. This is important as later articles in the regulations, and in a number of Schedules that attach to the regulations, specify that different processes must be followed depending on what type of water pollution event occurs. Readers of these explanatory notes should also read the Schedules to the regulations (below) as they provide more detail about particular procedures and processes that must be followed for various activities or actions. If there is concern about how a particular water pollution event has been managed, any individual, group, enterprise or business can make representation to the provincial environment protection bureau, or to the Shanxi Water Environment Committee (see article 7) if the concern or complaint relates to the bureau itself.

Article 4: *The water pollution prevention and control of the Fen River Basin shall be carried out in accordance with the principle of emphasizing control, combining control with prevention, and comprehensive management. Transjurisdictional water pollution management is a key factor in comprehensive water quality management of the Fen River basin. Control of domestic pollution shall be emphasized together with control of industrial pollution, and pollution control shall be emphasized together with ecologic restoration. The principle of integrated leadership, integrated plan and distributed responsibilities shall be adhered to. Basin level management shall be combined with regional management; integrated supervision and management of the environment protection department shall be combined with the cooperation and assistance in management of other relevant government agencies.*

This is a clear statement to all agencies and bureaus, and to the public about how supervision and management of water pollution prevention and control is to occur – combining control with prevention, comprehensive leadership, considering domestic and industrial pollution equally and pollution control and ecologic restoration equally. Most importantly, integrated management is specified and this means that all agencies and bureaus must work together to develop integrated plans and actions. No overlap or duplication of functions and no neglect of another agencies point of view. The general public can observe whether this strong form of integrated management occurs and can make representations to government on this matter.

Article 5: *The water pollution management targets of the Fen River Basin include: attainment of national water environment quality standard 5 by 2005; the severely polluted reaches in Taiyuan City meeting national standard for agricultural irrigation (for vegetables) by 2005; the reaches in Taiyuan City meeting national water environment quality standard 5 and other reaches all meeting requirements for water environment function by 2010; the water quality of the reaches in Taiyuan City meeting requirements for water environment functions by 2015.*

The provincial government may revise or adjust the above targets timely in accordance with the development of situation.

These water pollution management targets are not water quality standards which have a legal definition as defined in the WPPC law but are objectives (e.g. targets) the province believes can be achieved, bearing in mind that social and economic considerations must be balanced with the actions that might be taken to reduce pollution. In other words, the province must follow a 'balanced' strategy in rectifying polluting industries and towns so that social and economic impacts, such as economic costs or social costs due to closure of factories, are kept within acceptable limits. By clearly stating these management targets and monitoring progress and making this information widely available, all residents and groups in the Fen basin, the authorities will be able to assess whether the desired improvements in water quality are occurring and in a manner that is consistent with provincial social and economic goals and objectives. These balanced objectives are the basis for evaluating the long-term success of the plan. Specific in-stream or discharge standards are the means by which the regulatory process is carried out in order to achieve these longer-term targets.

Article 6: *The various levels of governments shall be responsible for the water environment quality within the boundary of their jurisdictions, shall incorporate water pollution management work into long and middle term plans and annual programs concerning social and economic development, establish accountability systems of the chief leaders of people's governments, and ensure the realization of water pollution management targets in the Fen River Basin.*

The people's governments at or above the county level within the basin shall establish mechanisms for monitoring the implementation of the river basin pollution management plan, and shall report annually to the people's congress，its standing committee of the same level, and to the public, on the status of the implementation plan and the water pollution management targets for the Fen River Basin.

By introducing clear rules for the agencies at various levels of government to include the water pollution management targets in long, middle and annual social and economic development programs and for progress on implementation of these plans to be openly monitored and reported to the people's congress at various level, and to the public, a new level of accountability for officials and agencies has been specified. If plans are not implemented, it will become clear to the peoples congress and questions will be asked as to why, and penalties will be administered. Plans can no longer simply be neglected without the real prospect of penalties being imposed for negligence.

Article 7: *Shanxi Provincial Government shall be responsible for the water environment quality of the whole Fen River Basin. This shall be carried out under a "Water Environment Committee[23]", which will be responsible for integrated basin management under the leadership of the provincial government.*

The chief leader of the provincial government shall chair the "Water Environment Committee of the Fen River Basin". The environment protection, planning, water resource, land resource, construction and agriculture department of the provincial government shall be members of the Committee, and various counties and cities within the basin shall also have their representatives in the Committee. The environment department will provide the secretariat to the Committee.

The major responsibility of the Committee is to discuss significant affairs related to water pollution management of the basin, coordinate the water pollution management work of the whole basin, assess the working results of various areas and government agencies on water pollution management, develop managerial systems for transjurisdictional water pollution prevention and control, and resolve transjurisdictional water environment disputes.

The creation of an inter-agency 'Water Environment Committee under the overall jurisdiction of the PPC, and having wide ranging powers and responsibilities for the coordination of water environment planning and management activities, is a new concept and has not been used to any degree in China. Its aim is to ensure integration of effort in water resources and water environment planning and to monitor and report how well all agencies are cooperating in integrating plans and generally working together to achieve effective integrated water resources/water environmental planning and management. It will also have a role in dispute resolution after normal processes have been exhausted. It does not replace the supervision, administration, operation and management roles of the water resources and environment protection agencies but adds a new level of accountability to assess agency performance in achieving agreed goals and targets. A Schedule that is attached to the Fen River Regulations (below) provides a detailed explanation of how the Committee will operate and how individuals, enterprises and working units may make representations to the Committee. This type of committee is widely used in western countries to achieve integrated water resources and environmental protection objectives.

Article 8: *The environment protection department of the provincial government shall be responsible for integrated supervision and management upon the water pollution prevention and control of the Fen River Basin and shall report regularly to the Committee.*

23 Under this Model Law it is recommended that there be a single provincial-level committee that is responsible for all aspects of water management. Any other water committees would be disbanded and replaced by this single committee. Specific activities can be conducted by joint working groups operating under the authority of the Water Environment Committee. In this model law, only the role of the Water Environment Committee in pollution management is covered. A separate decree would be required that details the full role of the Water Environment Committee in comprehensive and integrated water resources management.

The environment protection departments of the governments at municipal, county or prefecture level shall be responsible for integrated supervision and management upon the water pollution prevention and control of the Fen River within the boundary of their jurisdictions and shall report regularly to the provincial level environment protection department.

The planning, water resource, land resource and construction department of the governments at or above the county level shall assist and cooperate with the environment protection departments of the government of the same level in water pollution management of the Fen River, in combination with their own relevant responsibilities.

This article confirms that the various agencies will continue to undertake supervision and management roles as they have always done but will now be required to keep the Water Environment Committee advised of activities and progress toward various targets and goals as specified in plans approved by the PPC.

Article 9: *With advice from the environment department and other relevant departments, the provincial water resources department[24] shall develop within six months after these regulations are enacted, overall plans for the water resource development and utilization over various planning periods; identify the delineation of water function zones and determining the permissible total waste load[25] to the river. Permissible waste loads shall be revised annually to reflect the overall plan for the water resources development and utilization for the Fenhe basin and pollution control targets at national and basin levels.*

In accordance with the waste load targets developed above, the provincial environment protection department[26] shall develop within six months the plan for water pollution management and waste load control for the Fen River Basin over different planning periods. These plans shall include delineation of water environment function zones which will be harmonized with the water functions zones developed for water quantity management.

The water pollution management plan noted above and the water resource protection plan noted above shall be transmitted to the Water Environment Committee which shall create a joint working group of the environment and water resources departments. The joint working group, with input from other departments, shall integrate these two plans into a single, integrated "plan of water pollution control and water resources protection".

The Water Environment Committee will review the integrated plan, hold public hearings, authorize revisions to the plan as appropriate, and transmit the integrated plan to the provincial government for approval.

Subsequent revision of the above-mentioned plans shall be subject to the approval of the provincial government after being adopted by the Water Environment Committee.

---

[24] Refer to article 14, 15, 17 of Water Law

[25] Article 32 of Water Law

[26] Article 10 of the WPPC Law.

This article provides details on how the planning process is to occur and how there is an obligation for the water resources and the environment protection agencies to work together to form an integrated water resource protection/water pollution management integrated plan and for this integrated plan to be reviewed by the Committee, which can hold public hearings if thought necessary. Also, the public now have a role in commenting on the plans, which will ensure that a local perspective is included in the plans. A Schedule (below) is provided that details how the planning process is to occur and how the public can be involved.

Article 10: *The approved plan of water pollution control and water resources protection, and the plan for waste discharge load control of the Fen River Basin of different planning periods, shall serve as the fundamental basis for the water pollution management and water resource protection of the Fen River Bain, and shall be complied with by all levels of governments, working units and individuals within the basin. This shall include all control orders and other requirements of environment departments that are issued for the purpose of implementing the approved plan.*

The official plan shall be a public document which shall be available without cost to all working units and individuals within the basin. This document will be the basis for public accusations against the governments, working units and individuals within the basin that have failed to implement these plans and related programs.

This specifies that the integrated water resource protection/water pollution management plan once approved by the provincial government, becomes the 'official' plan and must be followed by the local level administrations in developing local plans. It also stipulates that the official plan shall be a public document, which allows independent monitoring of the implementation of local level plans to ensure that they comply with the official basin plan.

Article 11: *Under the regulations, public officials are accountable to the public for implementation of the plan. Any working units and individuals have the right to sue the governments, and officials for failure to implement the provisions of the plan. The basis for any suit shall be alleged negligence of officials or governments in implementing the plan.*

This article stresses that accountability of officials and agencies is now a very strong component of effective pollution management in the Fen basin – if there is negligence in performance of implementing the plans, or in fact, ignoring them, then officials, agencies or governments can be sued.

Article 12: *In accordance with the approved plans the various governments at municipal, county or prefecture level within the basin shall develop implementing schemes for the areas under their jurisdictions within 2 month, expressly prescribe targets for various stages of implementation and the measures to be adopted, and report to the provincial environment protection department for approval.*

If they fail to develop implementing schemes within the prescribed time limit, or if the developed plans fail to be approved, the provincial environment protection department can directly formulated implementing schemes for the relevant areas and order the relevant local governments to carry them out.

This places a strong responsibility for local level administrations to quickly develop implementing schemes and programs that will put into effect the requirements in the official integrated plan. If they fail to do so then the provincial EPB can develop and impose an implementation plan on the local administration, but only after the Water Environment Committee has been advised and offered its views to the bureau.

Article 13: *The environment protection department at the provincial level shall implement a plan of monitoring of the implementation of the pollution control component of the approved plan and report on implementation progress to the Water Environment Committee on a yearly basis or more frequently if required by the Water Environment Committee. Progress reported by the provincial environment department shall be evaluated by the Water Environment Committee against the overall objectives of the plan and against progress in improving water quality in the water function zones.*[27] *The Water Environment Committee will report on the implementation of the pollution control component of the comprehensive plan on an annual basis to the provincial government and to the public.*

The responsibility of the provincial environment protection department shall include oversight of compliance of local officials responsible for carrying out the plan. Where local official are found to be negligent in carrying out their responsibilities the Water Environment Committee may recommend administrative penalties be applied.

This article imposes a much stricter monitoring and reporting requirement to assess performance and progress toward achieving targets than has occurred previously and involves the Committee in assessing the overall performance and reporting annually to the provincial government. In this way each year, reviews can be made of progress, awards and punishments decided upon, changes made to targets and goals if thought necessary and adjustments made to responsibilities to better achieve results.

Article 14: *The provincial water resource department, in its role of managing the water resources of the fen River Basin，shall take into account the requirement for minimal ecologic flow and reasonable water level in the Fen River.*[28] *This shall be determined in consultation with the provincial environment protection department and shall be incorporated into the basin plan.*

This article specifies that the ecologic requirements of the river system itself must be taken into account in managing the overall flows in the river. The river is a living thing that has its own minimum requirements to avoid on-going and severe damage and these must be specifically considered in all water-related planning and management decisions.

Article 15: *In the cities and towns within the basin, domestic sewage treatment equipments must be established and necessary sewage pipe network must be ensured. The construction scale of urban sewage treatment equipments shall suit the development of the cities and towns.*

---

[27] Under the Water Law, water quality of water function zones is collected by the water resources department.

[28] Article 30 of the Water Law.

The planning and construction departments of the governments at or above the county level shall complete the establishment of urban sewage treatment equipments and necessary pipe network and ensure their regular operation, in accordance with urban construction plans and the need of the water pollution management and water resource protection of the Fen River Basin.

This provides detail on the obligations of governments at all levels to establish sewage treatment plants. This is in keeping with the goals of the regulations that stipulated equal attention to industrial as well as to domestic sewage treatment facilities. Progress and delays in installing sewage plants will be noted in the Water Environment Committee's annual report to the provincial government together with the reasons, and consequences for failure to meet the objectives of the plan. This level of detail provides the justification for making strategic changes to the overall plan, for seeking additional funds, etc.

Article 16: *Under these Regulations, water quality standards shall be established for:*

a) Wastewater from enterprises and from municipal discharges

Standards for wastewater shall be those established under national law, or more restrictive standards that may be authorized under these regulations. Standards may be concentration and/or mass based in order to meet water environment function zone standards established for the Fen River.

b) Water Environment Function Zones.

Standards for water environment function zones shall reflect targets for surface water quality, and are to be used as a basis for ensuring that upstream dischargers are adequately controlled so that water quality in downstream water environment function zones meets the required standards.

This article provides the legal basis for Shanxi Province to establish standards both for dischargers and for in-stream standards. The latter are required so that EPBs have a basis for justifying more restrictive discharge requirements, and to seek administrative or legal action against polluters who may be within their discharge quotas, but causing in-stream pollution that is unacceptable based on the in-stream standard. Without the in-stream standard it is difficult to justify why a discharger should be obliged to reduce his pollutant load (or concentration).

Article 17: *The environment protection departments of the various governments at municipal, county or prefecture level shall check and verify the concentrations and discharge totals of the listed*[29] *pollutants of the areas under their jurisdictions, in accordance with the protection targets for water body functions and the load control plans of the areas under their jurisdictions.*

Urban sewage shall be included in measurements of total permissible waste loads allowed in the basin and included in plans for total load control.

[29] Listed pollutants are those named in the comprehensive basin plan and/or in the national pollutant control legislation.

These measurements shall be incorporated into a waste discharge management information system that will be maintained by each EPB that carries out such responsibilities. The database shall include all discharge permitting information and other control information related to individual dischargers.

This article defines the responsibility for monitoring, checking and reporting on the pollution levels in various reaches of the river. It also requires that EPBs maintain a working database and waste control management information system. Normally, the provincial level EPB would ensure that all EPBs under its jurisdiction use a single type of information and database, and would develop standard data formatting, security, data exchange protocols, etc.

Article 18: *Dischargers whose discharge of listed pollutants have not exceeded national or local discharge standards and discharge load control quota, shall be issued waste discharge permits by the environment protection departments of the governments at or above the county level, but subject to continued compliance to the standards and load control quotas.*

Dischargers whose discharge has exceeded discharge load control quota shall eliminate pollution within a specified time limit. During the period of eliminating pollution within the specified time limit, they shall be issued provisional waste discharge permits.

Articles 17 and 18 specify the processes and procedures for issuing and managing waste discharge permits for those enterprises, working units or groups that discharge to surface water. All of these activities will be part of the annual reporting requirement for all administrations to the relevant peoples congress as well as by the Water Environment Committee in its annual report to the provincial government.

Article 19: *Control orders that specify the targets, tasks and deadlines for elimination of pollutants by the polluters, shall be recommended by the various levels of environment protection departments to the same level of government. The government shall decide whether or not the order should be issued after reviewing the terms of the control order. If the decision of the government is to issue a control order, the terms of the control order shall be carried out by the polluter according to the deadline specified in the control order.*

All control order recommended by various levels of environment departments and the final decisions of governments shall be transmitted to the Urban Construction and Environment Protection Committee of the Provincial People Congress for evaluation of the implementation of the basin water pollution control and water resources protection plan.

Control orders are important regulatory functions. Annual reporting should be done at a provincial level for numbers of control orders, compliance to control orders, follow-up actions including penalties or court actions, other recommendations, etc.

Article 20: *All dischargers shall discharge water pollutants in accordance with the prescriptions of their waste discharge permits. Waste discharge without permits are forbidden.*

Article 21: *The various levels of environment protection departments shall inspect enterprises and municipalities that discharge wastewater within their jurisdictions. Inspections shall be carried out on a frequent basis, and may be conducted randomly and without notice, to ensure continued compliance of the dischargers.*

Random inspections, without notice are an essential part of enforcing compliance. Follow-up actions should also include inspections to ensure that enterprises and municipalities maintain their wastewater treatment processes after inspections. Inspections should especially focus on those dischargers who are known to violate their permits.

Article 22: *The various levels of environment protection departments shall levy pollutants discharge fee in accordance with the concentration and quantity of pollutants discharged according to the waste discharge permit. Discharges above the permitted amounts will be subject to penalties provided under the regulation.*

It is essential that penalties be high enough and not subject to political interference, so they are a deterrent and not a de factor license to pollute.

Article 23: *Trading of pollution permits within discharge load control quota and under attainment of discharge concentration standards among different polluters, counties, cities or prefectures is allowable. Permit trading will be controlled by the provincial government.*

Detailed measures for carrying out pollution right trade shall be developed by the provincial environment protection department with joint efforts of the provincial planning, economy relations and trade, and pricing department.

Trading of load based pollution quotas is a market-based mechanism to achieve pollution control. It permits a more efficient approach to pollution control insofar as pollution from some sources can be reduced more significantly and more cheaply than from others. The result is better water quality at less cost to industry and to government. Schedule 5 (below) to the Fen River Regulations details the rules and processes that apply to the pollution trading scheme known as the 'Fen River Basin Pollution Trading Scheme'.

Article 24: *All development and construction projects within the Fen Rive Basin must comply with the overall plans for social development, the plans for water resource development and utilization and the integrated plan for water pollution management and water resource protection of Shanxi Province, and must comply with laws and regulations concerning construction projects and environment protection, including the Environment Impact Assessment Law.*

When developing and utilizing the water resources of the Fen River and establishing, expanding or rebuilding construction projects, relevant upstream areas shall take into comprehensive account the requirements of downstream areas for water quality and water quantity. When developing and utilizing the water resources of the Fen River and establishing, expanding or rebuilding construction projects, projects on one side of the river must shall take into comprehensive account the requirements of right-bank areas for water quality and water quantity. When developing and utilizing the water resources of the Fen River and establishing, expanding or rebuilding construction projects, relevant industrial, agricultural, commercial and tourist organizations shall take into

comprehensive account the requirements for water quality and water quantity to maintain ecologic environment of rivers and ensure necessary water level and minimal water flow.

The cities, counties and prefectures whose waste discharge load control quota have been exceeded, are not allowed to construct new projects with discharge of water pollutants into water bodies, or to reconstruct or expand projects which with increase on water pollutant total unless there is a load quota available within the approved basin plan, or an approved plan for equivalent reduction in pollutants from existing dischargers.

This article provides details about the processes that must be followed when new, expanded or re-built projects are proposed. The approving agency must satisfy itself that all relevant policies and plans have been followed and that the provisions of the Environment Impact Assessment Law are followed. The documents that detail the consideration of the approving agency will be available for public scrutiny if an application for information is made by the public. This document provides a basis for determining if officials have followed the correct procedures in any subsequent administrative or legal actions.

Article 25: *The establishment of waste discharge outlets within lakes, wetlands, reservoirs, canals and river channels in the Fen River Basin for newly constructed, expanded or reconstructed projects shall be subject to the consent of the responsible departments in charge of water conservancy projects at or above the county level, and the approval of relevant environment protection departments.*

This article makes such construction a joint responsibility of the water resources and environment departments.

Article 26: *Various levels of approving authorities for construction projects shall be held responsible for the projects approved by them for the lifetime of the project. Environment protection departments shall be held responsible for the environment impact assessment statement approved by them all the time, and for their check and acceptance of "the three simultaneity[30]" of environment protection equipment and facilities during the lifetime of the project. The units responsible for assessment, checking, acceptance and monitoring of environment impact shall be held responsible for the results concluded by them for the lifetime of the project.*

For construction of projects likely to cause transjurisdictional water pollution, at the time of examining and approving environment impact assessment statement, the environment protection departments of the places where the projects are located, shall consult the environment protection departments of the governments located in the downstream jurisdiction, as well as the working units and the public likely to be affected.

Under this Article, detailed records are required to be maintained for all environmental impact assessments and subsequent installation and operational inspections. These records are the basis for any further actions that may be required against the enterprise, or against officials

[30] This refers to the design, construction and operation of environmental facilities, such as a wastewater treatment plant, and that will be carried out simultaneously with the construction of the main project. This is one of the most important environmental policies in PRC.

who are alleged to have acted improperly. These records should be available to the public upon request.

Article 27: *The Fenhe Reservoir and its upstream areas belong to the key protection zones of the Fen River Basin, within which any development and construction activities with environment impact shall be forbidden.*

If the protected areas upstream of the Fenhe Reservoir are required to sacrifice their own economic interests in order to protect water resources and prevent ecologic environment aggravation, the areas and working units that have benefited shall make compensation on the aspects of economy, technology and subsidies according to rules established by the provincial government. National and local governments shall develop preferential policies including priority in transfer of high technology, tax exemption, aiding the development of ecological agriculture, promoting the adjustment of industrial structure, etc.

Upstream, but non-protected areas, which are denied the right to carry out urban and/or rural development in order to protect water quality in downstream areas, may apply for compensation according to rules established by the provincial government.

The upstream enterprises or areas that have caused economic loss to downstream areas due to polluting activities that are outside the terms of their permits shall make compensation to the downstream areas according to rules established by the provincial government.

Where economic loss in downstream areas is caused by upstream activities operating within the terms of their discharge permits, other remedies can be made through national financial aid, establishment of basin funds, and transfer of pollution right trade from upstream to downstream areas, assignment of unified agreements on water use and water control, etc.

This article is not intended to specify the nature of compensation, only that compensation is a legitimate factor. It is incumbent upon the PPC to develop a set of rules for compensation, which should be set down in a Schedule when they have been approved.

Article 28: *In the case of downstream pollution from a polluting incident or accident, the upstream jurisdiction will accept the water quality data of the downstream jurisdiction providing that the downstream laboratory that produces the information has followed the quality control and quality assurance procedures required under the State Quality Supervision Bureau. The upstream jurisdiction may request additional information however this may not be used to unreasonably delay the resolution of the pollution incident. In the case of dispute between the two local environment departments, an upper level unit of the environment department may be request to resolve the dispute.*

This article is intended to ensure that upstream jurisdictions do not unreasonably delay resolving pollution disputes due on the basis that the data collected was not collected by its own EPB. Quality assurance procedures are designed to make data sharing completely transparent in pollution dispute situations.

Article 29: *It is forbidden to construct severely polluting projects such as paper pulp manufacturing, coking, metallurgy, chemical industry and leather making that are listed by the provincial government. Existing, newly built, expanded or rebuilt industrial enterprises must carry out clean production actively, reduce consumption of materials and water, strengthen recycled utilization of water resources, and promote the process of turning sewage into a resource, in accordance with the laws and regulations regarding the operating of enterprises.*

Article 30: *Dumping of solid waste into the rivers or riverbeds is forbidden. It is also forbidden to discharge toxic or hazardous*[31] *waste water through holes, wells crevice, craters, etc. Transport or storage of toxic or hazardous waste water or other pollutants through pipes, canals and pits shall be protected by anti-infiltration and anti-leakage measures to prevent pollution to underground water sources.*

This is a very important article as it clearly specifies what cannot be done and as public involvement is now strongly included in the Fen River basin regulations, any person or organization that observes any behaviour contrary to the provisions of this article should immediately contact the provincial or local level EPB.

Article 31: *The water resources departments at appropriate levels will establish monitoring station for the determination of water quality in water function zones. Water quality of the water function zones will be evaluated annually for compliance with the objectives of the integrated plan of water pollution control and water resources protection and reported to the Water Environment Committee. Where the water quality is not in compliance, the Water Environment Committee will authorize an investigation into the reasons for lack of compliance and take any further actions required to bring the water function zones into compliance.*

This article is consistent with proposed amendments to the WPPC Law. It is very important that, for the success of this Article, that water function zones and water environment zones be harmonized (as required in the Regulations).

Article 32: *The various municipal environment protection departments shall report the water quality of monitored sections to the provincial environment protection department, which shall be responsible for gathering water quality information of the whole basin, and submitting water quality reports to the Water Environment Committee on a regular basis, and publicizing the water environment quality conditions of the Fen River Basin to the public.*

The Provincial EPB should develop standardized reporting procedures, which include both data and measures of data quality (analytical performance indicators).

Article 33: *The People's governments at the municipal level shall take measures to ensure the water quality of monitored transjurisdictional sections are in conformity with the requirements of environment function for neighbouring sections. When the water quality of transjurisdictional sections is found to be not in conformity with standards, the provincial environment protection department can give a disciplinary warning to or impose a fine to the upstream governments, and suggest the provincial government to give administrative warnings to the chief leaders of the upstream governments.*

[31] The terms "toxic" and "hazardous" shall be consistent with current and proposed national legislation.

Article 34: *The provincial environment protection department shall establish monitoring stations for waste discharge at the transmunicipal areas along the mainstream of the Fen River, identify applicable water environment standards, develop the system of regular monitoring, and monitor the waste discharge of various cities. The municipal environment protection department shall also establish monitoring stations for waste discharge at the transcounty levels along the mainstream of the Fen River, and supervise the waste discharge of various counties. Problems found shall be reported to the environment protection departments located in upstream areas or to the Water Environment Committee. The organizations that have accepted these reports shall inform the reporting units about the settlement results of the problems.*

This article specifies that monitoring shall be done to ensure transjurisdictional water quality standards are maintained.

Article 35: *Where construct projects in upstream areas likely to affect downstream areas the upstream areas shall notify the environment protection departments of the relevant downstream areas.*

When the occurrence of water pollution accidents or incidents that is likely to affect downstream areas, the upstream areas shall immediately notify the environment protection departments of the relevant downstream areas according to an emergency notification and reaction plan to be developed by the provincial government.

Articles 33 –35 deal explicitly with transjurisdictional water quality monitoring and reporting.

Article 36: *Dischargers shall establish waste discharge outlets in accordance with the requirements of the environment protection departments and will install automatic total discharge monitoring equipments for the purpose of measuring total quantity and quality of waste discharge, when required by the environment protection department and according to technical requirements of the environment protection department. Tampering with total monitoring equipment or unauthorized modifications of the equipment or data, is an offence and punishable according to the regulations.*

Dischargers that have failed to establish waste discharge outlets and/or monitoring equipment in accordance with requirements shall be subject to collection of waste discharge fees in accordance with the waste discharge quantity assessed on water consumption and will be ordered to comply with the outlets requirements within a designated time and will be fined on a daily basis until they have complied with the requirement. Exceptions to this provision may be granted on a limited basis by the environment protection department.

Article 37: *Enterprises that change their product or make major changes to their manufacturing process, must notify the relevant environment protection department according to provisions of the WPPC Law.*[32]

This article is especially important for supervising rural and village enterprises which frequently change their production process or product.

[32] Refer to article 14 of the WPPC Law.

Article 38: *Construction of underground projects or conduct of underground activities including exploration and mining, shall have protective measures to prevent pollution to underground water.*

A Schedule should be developed by the environment department and approved by the PPC that provides detailed guidance on the actions that must be taken for groundwater protection. This would have two main parts dealing with (a) groundwater protection zones, and (b) general protection requirements for any activity that could have polluting potential for groundwater. One important provision would be the actions required to prevent and/or remediate leaking underground storage tanks (petroleum fuels, etc.).

Article 39: *Dischargers that use, produce or discharge toxic or harmful substances*[33] *and the working units with the potential to cause water pollution accidents shall develop schemes to deal with emergent pollution accidents and report these to environment protection departments for record keeping.*

The Provincial EPB should develop specifications for the reporting and management of toxic chemical spills and releases into the river system. This should also specify the legal liabilities of persons or enterprises that release toxic chemicals into the environment.

Article 40: *The various levels of governments within the basin shall actively promote the process of planting trees and grass on farmed land, prevent soil erosion, actively spread the technologies of biologic control, develop water-saving agriculture and ecologic agriculture with scientific and reasonable application of fertilizers and pesticides to control non point source pollution. Fruit and vegetable market locations and related solid and liquid waste will be managed in such a way that pollution of surface waters will be prevented.*

Article 41: *Other non-point sources, especially animal and poultry raising, and related activities such as slaughter houses，food processing, packaging and warehousing, shall be carried out in such a way that runoff of animal wastes and production wastes shall not enter into surface or groundwater either directly or indirectly. Animal raising shall not be carried out immediately adjacent to water courses. Environments protection departments may require such enterprises to construct special facilities to contain liquid wastes and to dispose of these wastes in such a way that pollution is prevented.*

Articles 40 and 41 are a recognition of the growing importance in China of non-point source pollution, especially that associated with agriculture, including aquaculture, livestock and poultry production.

Article 42: *The water pollution disputes concerning compensation liabilities and compensation amount shall be settled through negotiation and consultation among various parties concerned. If negotiation and consultation fail, the disputes can be subject to conciliation conducted by the provincial environment protection department or the judgment of people's courts.*[34]

[33] The "toxic or harmful substances" shall be consistent with current and proposed national legislation.

[34] Full dispute settlement mechanisms are recommended in this report as part of future changes to the WPPC Law.

Transjurisdictional water pollution disputes shall be settled through negotiation and consultation among relevant governments organized by the environment protection department of the government of the next higher level. If negotiation and consultation fail, either party concerned in the dispute may apply to the "Water Environment Committee" for coordination and settlement. If coordination fails, either party concerned or the "Water Environment Committee" shall apply to the provincial government for arbitration.

Schedule 3 is provided on notification and dispute resolution.

Article 43: *For dischargers that discharge water pollutants without waste discharge permits the responsible environment protection departments shall order them to go through relevant formalities to apply for issue of permits within a specified time, and shall impose upon them a fine of not less RMB 5,000, and not more than RMB 50,000.* [35]*If the dischargers have failed to go through relevant formalities within the time limit, the relevant government may order the enterprise to be shut down.*

EPBs should have a standard, computerized information system for recording all aspects of permitting, fees, penalties, etc. Information on the types of enterprises, their discharge characteristics and other relevant information should be kept in this information system.

Article 44: *Dischargers that fail to discharge water pollutants in accordance with the terms and conditions of their waste discharge permits, the responsible environment protection departments shall revoke their original permits and issue them provisional permits, order them to rectify deficiencies in their discharge practices, and impose upon them a fine not to exceed RMB 50,000.*

Article 45: *Dischargers that have failed to accomplish pollution elimination tasks within the stipulated time limit shall have their provisional waste discharge permits revoked and may, at the order of the government, be order to be shut down.*

Dischargers, whose waste discharge fails to conform to the prescriptions of provisional waste discharge permit, shall be subject to a fine of not more than 50.000 RMB and may, at the order of the government be ordered to shut down.

Article 46: *According to Article 35, dischargers that have failed to regulate their waste discharge outlets, or that have failed to install total monitoring equipment for discharge measurement, shall be subject to an order to rectify the deficiency within a time limit by the relevant environment protection departments and may be subject to a penalty not to exceed RMB 10,000 per day until the enterprise complies with the original order.*[36]

Article 47: *Under Article 35, dischargers that have, without permission, dismantled, stopped the use of, or changed the discharge total monitoring equipment or caused false data, shall be subject to an order by the environment protection departments to restore the equipment to proper operating condition with a time limit and a fine not to exceed RMB 50,000 per day until the equipment is restored to proper operating conditions.*[37]

---

[35] Refer to the Rules to Implementation WPPC Law, Article 44.

[36] Refer to article 47 of WPPC Law and article 40 of the implementation of the detail rules of the WPPC Law.

[37] Refer to article 48 of WPPC Law and article 41 of the implementation of the detail rules of the WPPC Law.

Article 48: *Dischargers that have failed to connect with the network of environment protection departments or to input data in accordance with requirements shall be subject to a fine less than RMB 10,000.*

Article 49: *Dischargers that have failed to report water pollution accidents, or falsify information shall be subject to the order to make rectification by environment protection departments and a fine not to exceed RMB10,000.*

Article 50: *Dischargers that have used, produced or discharged toxic or harmful substances without development of preventative measures to ensure protection of water quality, shall be subject to the order of make rectification by environment protection departments and a fine less than RMB 10,000.*

Article 51: *The provincial environment protection department shall be responsible for the interpretation of the Regulations concerning the issues occurred during implementation of the Regulations.*

7.6.2. Schedule 1 - "Charter (Regulations) for the Fen River Water Environment Committee[38]"

The following text describes a detailed set of instructions (regulations) for implementation and operation of the Fen River Water Environment Committee. In international examples, it is the usual practice for there to be a detailed guidance document ("Charter") for such committees.

Chapter 1: General Provisions

Article 1: This Charter appears as Schedule 1 to the regulations on the Prevention and Control of Water Pollution in the Fen River and is formulated to provide for an institutional mechanism known as the 'Water Environment Committee' that can promote and coordinate activities for:

- The control and prevention of water pollution within the Fen River basin,
- Development of a coordinated and integrated plan for water environment management of the Fen River Basin
- Protecting and improving the ecological environment
- Collecting and sharing water related data relevant to water resources and water environment management.

These activities are conducted in accordance with the provisions of the WPPC law and other relevant laws, and on the basis of the real situation and practice in Shanxi Province.

Article 2: This Committee provides the mechanism for integrated water resource management required under both the WPPC Law and the Water Law (2002) and will be responsible for ensuring that the provisions and intent of both laws, as these apply to water

[38] Normally, this would be referred to as a "Schedule" to the Regulations. Schedules are numbered sequentially and form part of the Regulations.

pollution management and control, and to integrated water resources management, are carried out in the Fen River Basin.

While the Water Environment Committee will mainly focus on the implementation of the Fen River Regulations, all aspects of water resources management that impact upon water quality, including flow control, water diversions within, into or out of the basin, waste load capacity determinations, water function zones, monitoring, etc., shall be incorporated into the planning and oversight responsibilities of this Committee and all such activities carried out under the authority of the water resources departments in Shanxi Province that impact on pollution management shall be subject to the decisions of this Committee.

Article 3: Water pollution prevention and control of the Fen River basin shall follow the principle of emphasizing on:

- Control activities,
- Combining control with prevention, and,
- Integrated water resource management.

Control of domestic pollution shall be emphasized together with control of industrial pollution, and pollution control shall be emphasized together with ecological restoration. The principle of integrated leadership, integrated planning and integrated responsibilities and accountabilities shall be adhered to, and the accountability of officials will be assessed in determining an individual's performance in fulfilling job responsibilities. Basin management shall be combined with regional management; integrated supervision and management of the environment protection department shall be combined with the cooperation and assistance in management of other relevant government agencies.

Article 4: Shanxi Provincial Government shall establish a 'Water Environment Committee' to promote and coordinate the activities of all relevant agencies concerned with integrated management of water environment quality of the whole Fen River Basin. The Committee will be the forum at which to discuss significant affairs related to water resources and pollution management of the basin, coordinate the water pollution management work of the whole basin, assess the working results of various areas and government agencies on water pollution management, develop managerial systems for transjurisdictional water pollution prevention and control, and resolve, within the limits of its responsibilities, transjurisdictional water environment disputes.

Article 5: The Water Environment Committee will essentially be a coordinating body but is given a decision-making role as defined in this schedule 1 to the Fen River basin regulations. It will not be directly involved with water environment or water resources supervision and management activities. The environment protection department of the provincial government shall continue to be responsible for integrated supervision and management upon the water pollution prevention and control of the Fen River Basin, and shall report regularly to the Committee on progress and problems in overcoming water pollution issues.

The environment protection departments of the governments at municipal, county or prefecture level shall be responsible for integrated supervision and management upon the water pollution prevention and control of the Fen River within the boundary of their jurisdictions and shall report regularly to the provincial level environment protection department, or to the Committee for issues relating to water pollution control and prevention performance and improvements.

Article 6: The planning, water resource, land resource and construction department of the governments at or above the county level shall assist and cooperate with the Water Environment Committee and report any issues or problems that relate to the overall assessment and evaluation of the condition or 'health' of the Fen River basin's water resources and any matters that need improved coordination between agencies operating in the water resources and water environment area.

Article 7: The extent of jurisdiction of the 'Water Environment Committee' is the entire catchment or area of the Fen River basin, as identified in detail in Article 2 of the regulations on the "Prevention and Control of Water Pollution in the Fen River Basin" (called the Fen River Basin Regulations), and will cover the prevention and control of pollution of both the surface water bodies and underground water bodies including rivers, wellsprings, lakes, reservoirs, wetlands, and canals.

Chapter 2. The Water Environment Committee, Executive Committee, Office of the Committee

Article 8: The Water Environment Committee will derive its role and responsibilities directly from the various articles in the Fen River Basin regulations. It shall make timely and effective decisions on major issues relating to the coordination and reporting of water resources protection and pollution and prevention in the Fen basin. The institutional arrangements known as the 'Water Environment Committee' will comprise the Committee itself, an Executive Committee which will implement powers delegated to it between meetings of the Committee, and an Office of the Committee to handle administrative arrangements.

Article 9: The members of the **Water Environment Committee** shall serve concurrently with their normal administrative duties within the various levels of government within Shanxi Province. The Chief Leader of the provincial government shall chair the "Water Environment Committee" and will appoint a Vice-Chairman from one of the participating departments. The environment protection, planning, water resource, land resource, construction, and agriculture department of the provincial government shall be members of the Committee at no lower than Director level, and various counties and cities within the basin shall also have senior representatives on the Committee. Alternate delegates may attend meetings to replace a member of the Committee, provided the replacement is not less than one level below the rank or seniority of that Committee member.

The chair of the Committee may add members to the committee from time to time, who may have particular and relevant expertise or as representatives of major water user groups or enterprises.

Article 10: In addition to the general duties and responsibilities detailed in article 3 above, the Committee will:

- Develop appropriate policies, strategies, procedures and an agenda for integrated water resource management planning for the approval of the Shanxi provincial government that will ensure that effective integrated water resources and water environmental management occurs in the Fen River basin.
- Develop mechanisms and procedures to ensure an adequate amount of water resources and water quality data and information are readily available for water resources and water environment planning and management, by all interested and concerned agencies, enterprises and groups, and in accordance with an agreed pricing policy.
- Develop procedures to ensure the effective integration and linkages of water resource protection plans (as stipulated in the Water Law), and water pollution prevention and control plans (as stipulated in the WPPC law), including the planning and management of non-point source pollution.
- Discuss and comment on final drafts of the above integrated plans when submitted by the water resources and environment protection bureaus for consistency and effective integration. In the case of substantial disagreement or divergence of views with the bureaus that cannot be resolved through discussion or if deemed necessary by the Committee, public legislative hearings shall be held to gather comments from experts and the public, and the committee will then recommend final plans to the provincial government.
- Consider detailed submissions made by any municipal, county or prefecture government if it fails to complete the planning requirements under article 11 of the Fen River Basin regulations within the stipulated time period and then advise in a timely fashion, the provincial environment protection bureau of any comments before the bureau directly formulates an implementing scheme and directs the local administration to carry it out.
- Comment on the detailed measures developed by the provincial environmental bureau for carrying out trading of water pollution rights or quotas before commencement of any trading scheme and review the effectiveness of such a scheme annually.
- Develop procedures for reporting by county level governments and above, of the actions taken to implement approved plans for water resources protection and water pollution prevention and control, and on the prevailing water quality of the Fen River and tributaries compared with the water pollution management targets set in the Fen River regulations, and the environmental water quality standards set for water functions zones within each administrative area.
- Based on information provided by county level governments and above, collate annual reports on the ‘State (or health) of the Fen Basin Water Resources’, and in particular, on improvements or further degradation in water quality in the Fen River basin, on major polluters who contravene permit conditions and on the performance of various

administrations in managing water pollution issues in relation to agreed targets and goals, and submit to the provincial government for information.

- Develop detailed procedures and processes for assessing and resolving the variety of compensation claims that may arise from articles 23, 28 and 34 of the Fen River basin regulations, with particular emphasis on the procedures to notify and consult, for each party of the dispute to exchange timely information and respond to requests in a timely and efficient manner, and to widely publicise these procedures and processes.
- Publicize the role and responsibilities of the Committee as well as the processes that must be followed for the public and other interested bodies and enterprises to make representations to the Committee.
- Develop public awareness and school education programs and information that will encourage the 'masses' to learn more about water resources management and pollution issues and the measures that can be taken by the community to assist in improving water management.
- Any other activities or studies that the Committee might agree that need to be undertaken that are consistent with its role as specified in the Fen River basin regulations.

Article 11: The Committee will meet at least twice annually in the form of a unified conference. More frequent meetings can be called by the decision of the Chair, or by a submission supported by more than half of the Committee members, transmitted through the Office of the Committee. At least 75% of members, or their delegates, must attend to constitute a meeting at which decisions can be made. Decisions will be made on the basis of the endorsement of 75 % of the members attending a meeting. Major divergent views or disagreements shall be decided on by the Chair of the Committee.

The Office of the Committee will suggest the time, location, conditions and arrangements for expenses, and proposed agenda of meetings.

Minutes of the Water Environment Committee meetings shall be made and filed for future reference, and decisions widely publicized.

Article 12: The Committee can, if so agreed by 75% of members, establish sub-committees to consider water pollution coordination and integration issues in various sub-basins or tributary streams of the Fen basin, and particularly the planning for non-point source pollution on a sub-basin basis. Such sub-committees would include the Committee members from administrations within each sub-basin and be chaired by one of these based on an annual rotation, and also include any other experts or groups relevant to a sub-basin. Any such sub-committees would report to the full Committee at the annual unified conference.

Article 13: The Committee shall make at least one report annually on its work and submit this to the Provincial People's Congress of Shanxi province.

Article 14: The Executive Committee of the Water Environment Committee is the executive body of the full Committee. It shall exercise the role, functions and powers on behalf of the full Committee between Committee meetings and ensure the implementation of any decisions or recommendations made by the Committee.

The chair of the Executive Committee shall be appointed by the Chairman of the Water Environment Committee, and members will be the directors of the provincial environment protection department, provincial water resources department, provincial regional planning and finance bureaus. Additionally, five members will be appointed from municipal or county level administrations at director level of local environment protection bureaus and local water resources bureaus, and rotated annually to allow equal local level representation over a five-year period.

Meetings of the Executive Committee will be called by the Chair and its method of operation will be as for meetings of the full Water Environment Committee.

Article 15: The Office of the Water Environment Committee acts as the secretariat to the Committee, and its Executive Committee, and is a working body responsible for carrying out routine work. It is set up in the provincial environment protection bureau and will be staffed by officials serving concurrently with normal environment protection bureau duties, together with officials from other agencies seconded from time to time, to undertake particular activities and prepare specific reports. The Chair of the Committee will decide on the staffing requirements of the Office and the position of the leader of the office.

Article 16: The functions of the Office of the Water Environment Committee will be:

- Develop meeting agendas, keep records and carry out the routine work associated with the Water Environment Committee and its Executive Committee.
- Implement, oversight or monitor the response to, the decisions and recommendations of the committee.
- Collect, collate and analyse data and information sought by the Committee, prepare reviews and comments on the various reports and plans submitted to the Committee for comment, and prepare reports and information as to the on-going water quality of the water resources of the Fen River basin.
- Develop procedures and processes relating to the activities of the Committee.
- Process submissions and responses, and prepare proposals relating to the Committee's role in dispute resolution and compensation issues, and in raising community and schools awareness of water quality and pollution matters.
- Carry out other duties assigned by the Water Environment Committee.

The Office will establish and continually strengthen contacts with relevant county level and above agencies and officials and work closely with these agencies to achieve improvements in water quality and water pollution abatement in the Fen River basin.

Chapter 3. Mode of Operations

Article 17: The Committee, and its Executive Committee, will issue resolutions and decisions, and obtain information about, and report on, the overall water quality and distribution of water pollution within the Fen River basin, and the progress of all relevant agencies at local county level and above in supervising and managing water pollution issues to achieve water pollution management targets and standards set by the Shanxi provincial government, or by national laws and policies.

Article 18: The Executive Committee shall hold one symposium or seminar each year on the results of coordination of water quality issues and on the effectiveness of the supervision and management of water pollution issues in the Fen River basin. All relevant agencies at local county level and above will attend and submit a report and make comment about its efforts, achievements and disappointments to improve water quality within its administrative area. The outcomes and findings from the annual seminar will be widely distributed and form part of the Shanxi province's report to the central government on annual environmental management achievements.

Similar seminars may be conducted by any sub-committee of the Water Environment Committee set up under article 12 above, and the reports from such seminars will be discussed at the annual symposium.

Article 19: Funds for the operation of the Water Environment Committee will be incorporated as a special item from the provincial government. All administrations that are members of the Committee will pay their own expenses associated with attending meetings and for any salaries of their staff who serve concurrently on the Committee as an addition to their normal duties.

Article 20: The Executive Committee shall be responsible for the interpretation of this Charter. The Charter may be amended, on the recommendations of the Executive Committee to the full Committee, and approved by the Provincial People's Congress of Shanxi Province.

7.6.3. Schedule 2 - "Procedures for Data and Information Exchange

The following text describes the content of a schedule dealing with data and information exchange.

General Provisions

Article 1: The regulations on the 'Prevention and Control of Water Pollution in the Fen River Basin' have been enacted for the purpose of preventing and reducing water pollution within the catchment or basin of the Fen River and improving the ecologic environment.

Article 2: In these regulations, "water pollution" refers to the phenomenon that the change of water bodies' chemical, physical, biological or radioactive characteristics affects effective utilization of water, endangers human health, jeopardizes ecologic environment and causes

deterioration of water quality. Water pollution also occurs when water quality does not conform to the standards established under the regulations.

Article 3: To assist in implementing the regulations and to better achieve effective coordination between all the agencies at provincial and lower levels of government involved in all or part of water pollution control and prevention, the Shanxi government has established the "Water Environment Committee". The Committee will be responsible for ensuring that good integration of planning and monitoring activities occurs across the water environment sector to avoid unnecessary and costly duplication particularly in relation to monitoring and data collection. In particular, the Committee is to discuss significant affairs related to water pollution management of the basin, coordinate the water pollution management work of the whole basin, monitor and assess the working results of various areas and government agencies on water pollution management, develop managerial systems for transjurisdictional water pollution prevention and control, and resolve transjurisdictional water environment disputes.

Article 4: The Committee's activities are essentially those of coordination, monitoring and reporting and the **provincial environment protection department** shall continue to be responsible for integrated supervision and management of the water pollution prevention and control of the Fen River Basin and shall report regularly to the Committee for the purposes of overall assessment of the water pollution situation in the Fen River basin.

Similarly, the environment protection departments of the governments at municipal, county or prefecture level shall be responsible for integrated supervision and management upon the water pollution prevention and control of the Fen River within the boundary of their jurisdictions and shall report regularly to the provincial level environment protection department.

Article 5: It is recognized that to enable effective implementation and management of the Fen River regulations and to monitor whether the goals and targets for reductions in water pollution and improved water quality are being met, will require a considerable expansion of data and information monitoring networks and new procedures and processes for making this information of a uniform, acceptable quality and for it to be readily available to all levels of government operating in the Fen basin. To not make data available to other neighbouring administrations will only lead to costly duplication and increase the difficulty of resolving disputes in an equitable, fair and efficient way.

Article 6: The Water Environment Committee, as part of its coordination role in water pollution matters, shall develop oversight procedures that will ensure water environmental data and information are collected efficiently and are readily available to those agencies undertaking water pollution related work. The requirements of this Schedule to the Fen River basin regulations are drafted to facilitate integrated data and information management.

Chapter 1. Principles and Objectives

Article 7: In conformity with the particular provisions of the Fen River basin regulations**,** the data and information exchange and sharing among the administrations and enterprises represented on the Water Environment Committee shall be governed by the following principles:

1. Subject to national and Shanxi provincial laws and regulations, fully and openly exchange agreed levels of data and information on a regular and timely basis as necessary to implement effective water pollution prevention and control in the Fen River basin.
2. Data and information exchange and sharing, including the prioritisation of information needs, should be based on an efficient and equitable process, and without unfair burden on any member administration.
3. The data and information should continue to be stored and maintained in the agency that collects it, provided agreed and acceptable standards and quality assurance procedures are followed, as determined by the provincial environment protection bureau.
4. Any centralized data and information, and a directory as to where particular data are held, will be maintained by the provincial environment protection bureau and in a form that is readily usable by administrations on the Committee through an appropriate network and communication system.
5. Any additional, but presently uncollected, data and information that is required from time to time to facilitate effective water quality and pollution management in the Fen River basin will be considered by the Water Environment Committee's Executive Committee and a process and cost sharing arrangements endorsed for collecting the minimum necessary data at the lowest feasible cost in a timely and equitable manner.

Article 8: In conformity with these principles indicated in article 7, the main objectives or requirements in this Schedule are to;

1. Develop a **Water Environment Data Directory** detailing data, information and reports that are relevant to integrated water environment management, and that is available within all relevant organisations. The directory will also outline how this data can be accessed, in what form, at what cost etc. This directory prevents the costly duplication that occurs when agencies or enterprises are unaware of what existing data has been collected.
2. Develop a **Water Environment Data and Information Exchange Agreement** that is signed off and agreed to by all the member administrations of the Committee and other departments and agencies that contribute to the Fen River basin's integrated water resources management.

Chapter 2. Water Environment Data Directory

Article 9: The Water Environment Committee will oversee the development of a 'Water Environment Data Directory'. This directory will be essentially an 'information access system' and will contain information about what water environment data and information is available and its extent and quality, what time period and geographical area it covers, whom should be contacted to obtain the data and how it will be made available and what costs would

be involved. The directory will be made available free of charge to all administrations, institutes and interested enterprises and groups operating in the Fen River basin.

Article 10: The directory will include details about how to access at least the following data and information:

- Climatic - hydro-meteorological, including rainfall
- Surface water flow
- Surface water quality
- Groundwater occurrence, volumes and other related aquifer characteristics
- Groundwater quality
- Environmental and catchment information, particularly as related to non-point source pollution
- Water usage and pollution permitting data, including location of water intakes and effluent discharge points.

Article 11: In addition, the directory will:

- Cover the whole of the Fen River basin
- Include all water environment and related resources data sets to the required level of detail needed for integrated water environmental management and to assist in effective dispute resolution matters
- Present the data on the basis of the geographical area of the basin and its major tributary sub-basins
- Be capable of coordinating data from different archives covering different components of the water environment and natural resource base, to provide an integrated information output
- Maintain consistent data quality standards and compatibility criteria across the data network
- Specify how electronic data transfer, or other transfer processes, between all administrations in the Fen River basin can occur.

Article 12: Data and information will continue to be held by the agency that presently collects and stores the data unless otherwise resolved by the Committee, after advice from the provincial environment protection bureau.

Article 13: Written and electronic reports held by the member administrations of the Committee will be reviewed by those administrations and included in the 'Data Directory' if agreed to by the Committee.

Article 14: The provincial environment protection bureau will maintain the data directory. They will also determine issues of concern that may require changes or additions to the process and procedures governing the operation of the directory after advice from the provincial environment protection bureau.

Chapter 3. Water Environment Data and Information Exchange Agreement

Article 15: The administrations represented on the Water Environment Committee of the Shanxi province shall cooperate with one another in the exchange of water environment related data and information, subject to any restrictions required by national and provincial laws and regulations, commercial-in-confidence and copyright issues or any other restrictions that may be agreed to by the Committee.

Article 16: The data, information and reports that would be available for exchange would be those detailed in articles 10 and 11 above, but not limited in range or extent by this listing.

Article 17: Unless the Committee determines that the provincial environment protection bureau should include some data and information now held in local level agencies, in a provincial centralized data and information management system, the local level agencies at county levels will continue to hold and maintain the data and information, subject to compliance with agreed procedures.

Article 18: Quality assurance and standards for data and information collection, laboratory analysis, processing, interpretation, and storage will be determined by the provincial environment protection bureau and the water resources bureau for data within each bureau's mandate, and in accordance with relevant national and provincial policies, procedures, standards and quality assurance rules. Any disagreements as to quality assurance issues will be considered and resolved by the Committee.

Article 19: The Committee will agree on the methods and systems for exchange of data and information after advice from the provincial environment protection bureau.

Article 20: Any additional data and information, not presently available but required from time to time to facilitate good integrated water environment management, will be agreed to by the Committee, including procedures and cost sharing arrangements for collecting the minimum necessary data at the lowest feasible cost in a timely and fair manner.

Chapter 4. Reporting

Article 21: A report will be made annually by the provincial environment protection bureau to the Water Environment Committee as to the overall effectiveness of the procedures in this Schedule and will include any recommendations for modification and amendments of this Schedule to improve effectiveness and overcome any apparent problems.

Chapter 5. Interpretation

Article 22: The Water Environment Committee or its Executive Committee will interpret the requirements in this Schedule.

7.6.4. Schedule 3 - "Notification, Consultation and Dispute Resolution Procedures for Water Environment Issues in the Fen River Basin"

(Note: this differs somewhat from the more general dispute resolutions recommended as an amendment to the WPPC Law. A more specific set of dispute settlement mechanisms is required for specific basin legislation.)

1. General Provisions

Article 1: The regulations on the 'Prevention and Control of Water Pollution in the Fen River Basin' have been enacted for the purpose of preventing water pollution within the Fen River basin and for protecting and improving the ecological environment of the basin, in accordance with the provisions of the WPPC law and other relevant laws, and on the basis of the real situation and practice of Shanxi province.

Article 2: The regulations provide for procedures for notification, consultation, negotiation and compensation relating to a range of water pollution issues and this Schedule 3 to the regulations expands on these requirements and details the processes and procedures that must be followed in notifying of a pollution event and of the negotiating and compensation issues that may follow notification.

Article 3: For the purposes of the Fen River Basin regulations and this Schedule 3, the following definitions apply,

- "Water pollution" refers to the physical, chemical, radiological or biological status of a water body in which the physical, chemical, radiological or biological properties are inferior to approved water environment standards for the water body, or that negatively affect its intended use, endanger human health, or damage the ecosystem, or where consequent economic loss can be demonstrated."
- A "Pollution Accident" is a result of short-term, unplanned, accidental situation which cannot be predicted and is beyond the ability of authorities to control."
- A "Pollution Incident" is a short-term polluting state that is causes by unauthorized or illegal discharge of polluting substances that could have been reasonably prevented by due diligence and/or appropriate management on the part of the polluter.". It may create an 'emergency' situation, if it is likely to cause severe environmental, human or economic damage"
- "Pollution Condition" refers to the long-term, ambient conditions that exist in surface or ground waters, arising from the cumulative impact of effluents and runoff from non-point sources."

Chapter 1. Notification

Article 4: If a proposed project is considered likely have a transjurisdictional impact, as per Article 24 of the Fen River regulations, the environment protection bureau responsible for approving the project will notify the corresponding bureau in administrations where likely impacts may occur and provide all relevant details to enable that administration to assess the degree and type of possible impacts. The notification will be as per the form at annex 1 to this Schedule 3.

Article 5: The administrations that have been notified as per article 4 above will respond in a timely fashion and will ask for consultations with the approving bureau if concerns as to likely impacts remain unresolved.

Article 6: If no agreement can be reached, the matter will be referred to the provincial environment protection bureau, which will make a decision on the suitability of the project.

Article 7: If, as per article 23 of the Fen River regulations, an upstream administration in the Fen River basin considers that it has been required to sacrifice reasonable and expected levels of economic development in order to maintain water quality:

1. As a result of the declaration of a key protection zone, or,
2. To provide higher quality water than required by provincial standards and policies to offset excessive levels of pollution in a downstream administration areas.

The upstream administration can notify or apply to the provincial environment protection bureau for compensation, in the form of economic, technologic or other such subsidies or assistance. Such applications will include all necessary information to enable the application to be considered in detail. Applications will be processed without delay and returned promptly to the notifying administration if data and information is incomplete. Any form of compensation will not apply for an administration that withholds economic development to the extent necessary to comply with standards and policies set by the provincial government to achieve an agreed level of river health. This action is simply complying with obligations to manage river health to acceptable standards.

Article 8: After assessment, the provincial environment protection bureau will report the matter to the Water Environment Committee for comment as to the appropriateness of the claim, and after receiving a response, will, without delay, make recommendations to the provincial government.

Article 9: If a downstream administration considers that water pollution is occurring from an upstream area from either a pollution accident, incident or on-going condition in excess of standards and targets, as defined in article 3 of this Schedule 3, it will immediately notify the upstream administration together with technical data and information to support the notification, as per the form at annex 2 to this schedule 3. Such technical data and information will be in a form that complies with the national and provincial rules and procedures for quality assurance and quality control of data collection and analysis. If other data is provided that does not meet these requirements, it shall be supported by signed statements from the officials involved to verify the nature of the claims in the notification. Where single samples are used to determine cause, then a suitable "chain of custody"[39] certification will be included.

[39] A "chain of custody" certification is a complete record, signed by a quality assurance officer, that indicates how the sample was taken, how it was stored, handled, and analyzed, the quality assurance used, and how the data were processed.

Article 10: If the pollution incident is of an emergency nature, this will be advised by electronic or telephonic communications and stipulated in the formal notification sent as soon as possible and the upstream administration will take immediate action to cease the cause of the pollution or seek immediate clarification from the downstream administration if the cause of the incident is unclear or unknown.

The administrations that receive the notification will advise the downstream administration as soon as possible of the receipt of the notification and whether further information is required to evaluate the claim in the notification. Such a request for further information will not be used to unfairly delay consideration of the matter and if the downstream administration considers that unfair delays are occurring, it will immediately refer the matter to the provincial environment protection bureau for investigation and rectification. The bureau will inform the Water Environment Committee for record.

Article 11: As per the form provided in Annex 2 to this schedule 3, if an upstream administration determines that a pollution accident, incident or prevailing pollution condition is occurring, or has occurred, it will immediately notify the downstream administrations likely to be affected and provide adequate technical information for an assessment to be made of the extent and type of impacts that could occur.

Article 12: The downstream administrations so notified will immediately investigate the matter and advise the upstream administration of any adverse impacts that have occurred and of any emergency aspects that have arisen and will seek consultations to resolve the matter.

Chapter 2. Consultation and Negotiation

Article 13: All water pollution matters of a transjurisdictional nature will first follow the notification procedures in articles 4 to 12 above. If the matters are not resolved and an on-going dispute occurs, this will then be a matter of consultation and negotiation between the parties involved.

Article 14: If after a reasonable time of negotiation, or if one party believes that excessive and unfair delays are occurring in the consultations and negotiations, that party can so advise the provincial environment protection bureau. The EPB concerned will then recommend to the Water Environment Committee, the action that should be taken.

Article 15: If the Committee cannot resolve the matter, it will be refer the matter to the provincial government for consideration, with a recommendation as to what action should be taken.

Article 16: For water pollution disputes between private parties, enterprises or groups, consultation and negotiation will be followed first and if the matter cannot be resolved the disputes can be subject to conciliation by the provincial environment Protection bureau or ultimately by the people's courts.

Chapter 3. Compensation

Article 17: For all water pollution disputes of a transjurisdictional nature involving more than one government administration, any claim for compensation will be documented as part of the notification process as detailed in Chapter 2 of this schedule 3, or as a supplementary notification later when the full impact of any alleged water pollution event is more fully known and documented.

Article 18: The administrations from where the pollution event is alleged to have originated will comment without delay on the compensation claim either as part of the response to the initial notification, or later upon receipt of a supplementary notification advising of further, more detailed information as to the impact of the pollution event.

Article 19: The administrations that are party to the dispute will seek to agree on any level and type of compensation that might apply having in mind the circumstances of the pollution event, and whether it is classed as an 'accident', 'incident' or 'condition' as defined in article 3 of this Schedule 3. If after a reasonable time, the matter of compensation remains unresolved, or if one party considers unnecessary delays are occurring, the dispute and claim for compensation will be referred to the Water Environment Committee, through the provincial environment protection bureau, who will assess the matter prior to submission to the Committee.

Article 20: If a compensation issue still remains unresolved, the Committee will recommend action to the provincial government for consideration.

Article 21: Any unresolved claim for compensation arising from a pollution event by private parties, enterprises or groups against another private party or a government agency, bureau or officials, will be first subject to conciliation by the provincial environment protection bureau, and then, if still unresolved, through any action one or more of the parties might take in the people's court.

Chapter 4. Accountability

Article 22: The accountability for interpreting the articles in this Schedule 3 will be with the provincial environment protection bureau. The assessment of how various government administrations have implemented this schedule 3 and how effective the articles have been in effectively and speedily resolving disputes will be undertaken annually by the Water Environment Committee, based initially on an assessment provided by the provincial environment protection bureau. The Committee will include its assessment in its annual report to the provincial government.

Annex I
Form/Format for Notification of Proposed Projects

1. Notifying Administration
2. Date of notification: Notifying Bureau/Agency (name, address, telephone, fax, e-mail)
3. Contact Person/Address (name, address, telephone/fax/e-mail)
4. Name of the project
5. Location of the project
6. Nature of the proposed project
7. Purpose of the Project
8. Expected date of the implementation if approved:
   a)- Date for starting the construction
   b)- Date for finishing the construction
   c)- Date for the operation
9. Description of the project (i.e. scope, scale, map , type, quantity, capacity and characteristic, etc.)
10. Attached documents
11. Nature and Extent of Possible Impacts

Annex 2
Form/Format for Notification of Occurrence of a Water Pollution Event

NOTE: This form is to be used either by a downstream administration formally advising of an alleged harmful pollution event originating in an upstream administration, or by an upstream administration notifying of a water pollution event that may impact on downstream administrations.

1. Notifying Administration:
2. Date of notification:
3. Notifying Bureau/Agency (name, address, telephone, fax, e-mail):
4. Contact Person/Address (name, address, telephone/fax/e-mail):
5. Has the Water Pollution Event Been Notified Earlier by Email or Telephone? If so, details.
6. Nature and Extent of Water Pollution Event.
7. Any Emergency Aspects that Need Immediate Response:
8. Description of the Water Pollution Event (i.e. scope, scale, map , type, quantity, characteristic, likelihood of human or aquatic damage etc.)
9. Attached documents
10. Any Claim for Compensation? Will supplementary details be provided later? If so, when?

NOTE: Please respond within 5 days by Email, fax or mail that this notification has been received and is being considered and when a formal response is likely. In the case that the event is deemed as an emergency as per section 19 above, please respond immediately by telephone if such contact has not already been made.

7.6.5. Schedule 4 - "Policies and Planning for Integrated Water Resource and Water Environmental Management in the Fen River Basin"

1. General Provisions

Article 1: This schedule 4 to the Regulations on the Prevention and Control of Water Pollution in the Fen River is formulated to provide a clear specification of the processes that are to be followed to establish provincial policies and plans that will guide effective integrated water resource and water environmental management in the Fen River basin.

Article 2: Under the regulations, Shanxi Provincial Government shall establish a 'Water Environment Committee' to promote and coordinate the activities of all relevant agencies concerned with integrated management of water environment quality of the whole Fen River Basin. The Committee will be the forum at which to discuss significant affairs related to water pollution management of the basin, coordinate the water pollution management work of the whole basin, assess the working results of various areas and government agencies on water pollution management, develop managerial systems for transjurisdictional water pollution prevention and control, and resolve, within the limits of its responsibilities, transjurisdictional water environment disputes.

Article 3: The Water Environment Committee will be essentially a coordinating body but is given a decision making role as defined in Schedule 1 to the Fen River Regulations. It will not be directly involved with water environment supervision and management activities but will undertake, as part of its duties, the development of a policy framework and planning guidelines for integrated water resources and water environment management under which the various bureaus and departments will carryout their managing and supervision responsibilities.

Article 4: The environment protection department of the provincial government shall continue to be responsible for integrated supervision and management upon the water pollution prevention and control of the Fen River Basin and shall report regularly to the Committee on progress and problems in overcoming water pollution issues.

The environment protection departments of the governments at municipal, county or prefecture level shall be responsible for integrated supervision and management upon the water pollution prevention and control of the Fen River within the boundary of their jurisdictions and shall report regularly to the provincial level environment protection department, and to the Committee, through the provincial bureau, for issues relating to the assessment of water pollution control and prevention performance and improvements.

Article 5: The planning, water resource, land resource and construction department of the governments at or above the county level shall assist and cooperate with the Water Environment Committee in its role of developing a policy framework and planning guidelines as described above.

Chapter 1. Creating a Policy Framework for Integrated Water Resources and Water Environment Management in the Fen River basin

Article 6: The Water Environment Committee will have the responsibility of developing, and submitting to the provincial government, a policy framework that will guide how the various agencies, bureaus and departments are to complete strategies, plans, actions and projects related to integrated water environment management.

Article 7: To facilitate the framework mentioned above, the provincial environment protection department and the provincial water resource department will, in consultation with each other, prepare a list and description of all the components of the surface water and groundwater quantity and quality management cycle that require a policy determination to clearly reflect the views and aspirations of the provincial government, consistent with national laws, regulations and policies. This listing and descriptions will be sent to the Water Environment Committee within 3 months of the commencement of the Fen River basin regulations.

Article 8: It is expected that the listing of relevant components that may require policy statements to provide clearer guidance for effective integrated water environment planning and management, and to control any possible adverse impacts, would include, but not be confined to:

Water Utilisation

- Flood prevention
- Water logging control
- Irrigation
- Navigation
- Water supply
- Hydropower generation
- Bamboo and log rafting
- Aquaculture

Resource Condition

- Native fish management
- Flood plain health and vegetation maintenance
- Catchment management
- Wetlands
- Riparian lands adjacent to rivers
- Sand and gravel extraction
- Water use efficiency and demand management
- Setting ecologic flows
- Non-point source pollution

Social and Economic

- Surface water and groundwater trading of water licenses
- Trading in water pollution load quotas
- Water pricing to achieve efficiency of use
- Drought management
- Measuring the sustainability of Fen River basin utilisation
- Community awareness and education of natural resource issues.

Article 9: The Committee will consider the listing and if necessary, will arrange public hearings and consultations to obtain the views of the local level administrations, private groups, farmer associations and enterprises and the community in general.

Article 10: The Committee will then seek the endorsement of the provincial government to the policy development agenda and when approved, will liaise with the provincial water resource and environment protection bureaus as to determining priorities and a timetable and specific responsibilities for developing draft policy statements for all components on the approved listing. The bureaus will consult each other and if necessary, will work jointly, in undertaking this work and will consult with private groups, enterprises and the broader community as necessary. Reports on the level and degree of public consultation will be attached to each draft policy statement, as well as a notation indicating the linkage to any relevant national laws, regulations and policies and how each policy is cross-referenced to other completed or unfinished policies, when it is forwarded to the Water Environment Committee for consideration.

Article 11: The Committee will debate, amend as necessary and endorse each policy statement and submit, either individually or as a group, the policies to the provincial government for approval.

Article 12: The Committee will widely publicise the policy agenda and each policy statement as it is completed and will table all policies for discussion at the annual water environmental management seminar or symposium that the Committee is to organise as part of its defined responsibilities, as listed in Schedule 1 to the Fen River basin regulations.

Chapter 2. Water Resource/Water Environment Planning in the Fen river basin

Article 13: Planning for water resource and water environment management is based upon authorities contained in the WPPC Law (1996) and the Water Law (2002).

Article 14: In following the provisions of these laws for water resource and water environment planning in the Fen River basin, the principle of integrated planning and plans will be the overall guiding concept. The Water Environment Committee will have the responsibility for ensuring that all relevant agencies and bureaus consult and work jointly, as necessary, to ensure the principle of integrated planning is followed. The Committee will

develop procedures and processes that must be adhered to by the various agencies undertaking planning and these procedures and processes will be widely publicized at all levels of administration and the community throughout the Fen basin.

Article 15: Water Resources Plan: With advice from the provincial environment department and other relevant departments, and in accordance with the requirements of article 14 of the national Water Law and any relevant basin wide policies for the Yellow River basin, the provincial water resources department shall develop comprehensive plans for the water resource development and utilization of the Fen River basin over various planning periods, identify the delineation of water function zones and determining the permissible total waste load to the river. These plans will be completed without delay and be submitted to the provincial government for approval after comment by the Water Environment Committee and after approval, will become the comprehensive or umbrella plan under which all specialized plans will be subordinated. The plan will include a statement of all government policies that were considered during the preparation of the plan as well as cross referencing to other planning issues relevant to the Shanxi province.

The water resources department will consult widely with local level administrations, enterprises, private groups and farmer associations in the development of this comprehensive plan and will attach to the draft plan a report of the consultations undertaken and the level of participation by local groups that was achieved.

Article 16: Once the comprehensive water resources plan is approved, it will be sent to the Water Environment Committee and to the provincial water resource and environment protection bureaus for joint agreement as to the priority, timetable and approach for preparation of the various specialty plans as required under the Water Law and the WPPC law.

Article 17: In particular:

1. The provincial water resource department will, within six months prepare the specialized water resource protection plan as required under the Water law and the Fen River basin regulations, and will consult widely at all levels of local level administration and water utilization units in the preparation of the plan.
2. The provincial environment protection bureau, in accordance with the waste load targets developed above, shall develop within six months the plans for water pollution management and waste load control, in-stream standards and ecological objectives for the Fen River Basin over different planning periods. These plans shall include delineation of water environment function zones which will be harmonized with the water functions zones developed for water quantity management and will take account of the water pollution management targets as specified in article 5 of the Fen River Regulations,
   - attainment of national water environment quality standard 5 by 2005;
   - the severely polluted reaches in Taiyuan City meeting national standard for agricultural irrigation (for vegetables) by 2005;

- the reaches in Taiyuan City meeting national water environment quality standard 5 and,
- other reaches all meeting requirements for water environment function by 2010; the water quality of the reaches in Taiyuan City meeting requirements for water environment functions by 2015.

The bureau will consult widely at all levels of local level administration and water users and dischargers in the preparation of the plan.

Article 18: The water pollution management plan noted above and the water resource protection plan noted above shall be transmitted to the Water Environment Committee which shall create a joint working group of the environment and water resources departments. The joint working group, with input from other departments, shall integrate these two plans into a single, integrated plan of water pollution control and water resources protection.

The Water Environment Committee will review the integrated plan, hold public hearings, authorize revisions to the plan as appropriate, and transmit the integrated plan to the provincial government for approval.

Subsequent revision of the above-mentioned plans, shall be subject to the approval of the provincial government after being adopted by the Water Environment Committee.

Article 19: The approved integrated plans for water pollution management and water resource protection, and the plans for waste discharge load control of the Fen River Basin of different stages, shall serve as the fundamental basis for the water pollution management and water resource protection of the Fen River Basin, and shall be complied with by all levels of governments, working units and individuals within the basin. This shall include all control orders and other requirements of the environment department that are issued for the purpose of implementing the approved plan.

The official plan shall be a public document which shall be available without cost to all working units and individuals within the basin. This document will be the basis for public accusations against the governments, working units and individuals within the basin that have failed to implement these plans and related programs.

Article 20: The Water Environment Committee will widely publicise the official plan with explanatory notes to ensure that all water users and dischargers, and all levels of local administration throughout the Fen River basin, are fully aware of the content and obligations and accountabilities relating to the plan.

Article 21: Various levels of local governments shall develop local implementing plans for water pollution control and water resource protection with 6 months of being made aware of the official integrated plan mentioned above, or a time specified by the provincial government or the Water Environment Committee and in accordance with the integrated basin level plan. These plans will be submitted for approval to the provincial environment protection bureau, which will review the plans for compliance with both relevant national and provincial policies and the content of the integrated basin plan.

As for those local governments that have failed to develop local implementing plans within a prescribed period, and those whose plans have failed to be approved, the provincial environment protection department will, in the first instance, consult with the local government and if not satisfactorily resolved, may develop implementing plans for them directly and order the relevant governments to comply with accordingly. Such plans developed by the provincial bureau must be referred to the Water Environment Committee for comment before the local administration is ordered to implement them.

Article 22: The various levels of governments shall be responsible for the water environment quality within the boundary of their jurisdictions, shall incorporate water pollution management work into long and middle term plans and annual programs concerning social and economic development, establish accountability systems of the chief leaders of people's governments, and ensure the realization of water pollution management targets in the Fen River Basin.

Article 23: If in the integration of the water pollution prevention plans with social and economic development plans, the local administration considers that there is conflict in the various environmental, social and economic objectives that are required to be achieved and that the water pollution prevention targets cannot be met, it must immediately advise the provincial environment protection bureau with supporting reasons and documentation as to why this is the case.

The bureau will review the matter and recommend to the Committee what line of action could be taken. The local administration will be given the opportunity to make direct representations to the Committee and if an adjustment is considered necessary by the Committee to any of the water pollution prevention targets or conditions in any plan or control order, then it will recommend accordingly to the provincial government.

Chapter 3. Interpretation

Article 24: The provincial environment protection bureau will have responsibility for interpreting the content and provisions of this Schedule 4 to the Fen River basin regulations. If an issue arises whereby the specific responsibility of the bureau is at question, then the matter will be determined by the Water Environment Committee.

7.6.6. Schedule 5 - "Trading in Load-based Water Pollution Quotas"

General Provisions

The object of this Schedule to the Fen River regulations is to provide for improved management of pollutant discharges in the Fen River catchment by the establishment of procedures (known as the 'Fen River pollution trading scheme') for trading of water pollution load based quotas as allowed for in article 19 of the regulations.

Any working unit, municipal agency, enterprise or private group that holds a waste discharge permit for discharging a load based pollutant quota into the main stem or tributaries of the Fen River catchment will be permitted to do so only in accordance with the rules applying to the scheme, and can trade all or part of any quota, either permanently or temporarily, but only in accord with the rules of the scheme.

The Shanxi provincial environment protection bureau will create 'XX" pollution quota units that represent the total pollutant load that can be discharged into the river system. A number of the quota units will be kept for issue to new industries and activities that will need to discharge to the river and the remainder of the units will be distributed to existing dischargers in accord with rules and procedures detailed in the Schedule.

A quota unit allows the holder of the waste discharge permit to discharge that volume of pollutants defined by a quota unit subject to any specific rules concerning maximum concentration limits for various water quality parameters. As well, the use of the quota unit must only be activated if the person, group, organization or enterprise has a current and operating waste discharge permit issued by the relevant environment protection bureau.

This Schedule of the Fen River basin regulations provides for the establishment, operation and administration of the Fen River basin pollution trading scheme and authorizes the provincial environment protection bureau to supervise and exercise enforcement powers in relation to the trading scheme.

The following outlines the nature of the material that should be contained in this Schedule. A full text has not been discussed here as it is beyond the requirements of this project.

Chapter 1. Introduction

- Name of pollution trading scheme
- Definitions
- Participants in the scheme
- Fen River basin

Chapter 2. Water Pollution Quotas

- Creation of water pollution quotas
- Lifespan (period) of quota
- Who may hold the quota
- First issue of credits to existing dischargers
- Allocation of remaining quotas to new or expanded activities:
  - By auction
  - By private sale
  - By free allocation.
- Application for quota must be on proscribed form
- Number of quota units to be allocated

Chapter 3. Management and Supervision of the Trading Scheme

- Classification of the river system:
  - Water function zones
  - Water environment function zones
- Total allowable pollution load in each classification
- Limitation of quota discharge for particular flows
- Establishment of a river register to record quota details
- Register to be available for public view

Chapter 4. Quota Discharge Rules

- Limiting conditions on permits
- Calculating volume and concentration of quotas for discharge at any time
- Emergency conditions and implementation

Chapter 5. Trading in Pollution Quotas

- Location of trade administrator
- Registration of quota traders
- General rules for trading quotas
- Retrospective trading not permitted
- Rules and procedures for transfers within:
  - A water function zone
  - Between water function zones
  - Within one local level administration area
  - Between two local level administration areas
- Type and location of register of trades
- Register to be available for public inspection

- Trades to be entered into register
- Corrections or adjustments to register

Chapter 6. Administration of Trading Scheme

- Scheme Coordinator for each local administrative area
- Power to engage private contractors to undertake functions
- Functions of the provincial EPB
- Appointment of an Operations Committee
- Functions of an Operating Committee
- Failure by operations Committee to perform duties

Chapter 7. Cost Recovery

- Load based discharge permit charge
- Cost of processing pollution trading application
- Payment of trading fee

Chapter 8. Enforcement and Penalties

- Provisions of the Fen River basin regulations apply
- Enforcement power of provincial EPB
- Notification of an offence against the trading rules
- Cancellation of right to participate in the trading scheme
- Appeal rights against decision of provincial EPB
- Offence of providing false information
- Role of the 'Water Environment Committee'
- Suspension of the trading scheme
- Review of the rules and procedures of the scheme

Attachments

1. Allocation of quotas to existing dischargers
3. Charter and procedures of the Operations Committee
4. Dictionary (Explanation of Terms)

8. RECOMMENDATIONS FOR AMENDING THE NATIONAL LEGISLATIVE FRAMEWORK TO ADDRESS TRANSJURISDICTIONAL WATER POLLUTION

8.1. Introduction

At present, there are mainly two State-level laws, ie. *Water Pollution Prevention and Control Law* and *Water Law*, related to transjurisdictional water pollution. Additionally, *The Yellow River Law* that is now under discussion also concerns the issue of transjurisdictional water pollution. In the course of this project many of our research papers have demonstrated the many problems in the current two laws. Although progress was achieved in some aspects in the 2002 revision of the *Water Law* the problem of transjurisdictional water pollution has not been resolved. Therefore, as part of this technical assistance project, we are asked to recommend revisions in the State legislation in order to clarify and resolve the problem of transjurisdictional water pollution and related issues of water environment management.

Drafting of law in western countries requires coordination between and amongst various laws in order to provide clarity of roles and responsibilities. It is well known that two separate committees of the National Peoples Congress largely drafted the WPPC Law and the Water Law according to the requirements and mandate of each ministry, and contain provisions of mandate as perceived and interpreted by each ministry. The consequence is that these two laws contain inconsistencies, lack of clarity over responsibilities and processes, and inadequately defined requirements for administrative coordination between the two ministries.

Also in western countries, the laws are much more focused on process and procedures and are, therefore, much more substantial than laws in the PRC. In the PRC, the current two laws (WPPC and Water Laws) tend to reflect statements of principle, and even in the Implementing Rules, lack detail on processes and procedures, and do not contain specific accountabilities for achieving closure in a wide range of areas. As a consequence the provisions for transjurisdictional pollution management including, in particular, basin planning process, provisions for total load control, dispute settlement, and administrative coordination, are quite inadequate. This has several consequences, including poor basin planning with a lack of administrative coordination, conflicting administrative requirements in developing total load control implementation, lack of direction for provincial legislative drafters in developing good local laws for local and transjurisdictional water pollution management and control, and at the highest levels, continuing friction between SEPA and MWR over jurisdiction and mandate. A further consequence is that, in legal actions in the courts, the laws are frequently unclear so that judicial decisions are necessarily arbitrary and inconsistent from one court to another.

More generally, for transjurisdictional water pollution, the WPPC Law, the current basis for seeking administrative action for pollution is mainly on the basis of proving damage. This is inconsistent with modern pollution issues such as toxicity, public health concerns, etc., where specific and/or long-term damage may be difficult to prove. Currently, there is no legal basis in the WPPC Law for one jurisdiction to seek administrative or judicial actions against another jurisdiction for pollution. Also, there is no provision for accountability of an upstream jurisdiction for liability for allowing pollution in a downstream jurisdiction. A core issue in

transjurisdictional water pollution is the unresolved status of so many pollution disputes. This is, in part, the result of an inadequately defined dispute resolution process in the WPPC, which currently is based solely on administrative interactions with an unclear process and no requirement for closure.

Our conclusions and recommendations are in three parts:

- The overall legal framework of PRC, but focusing on specific concerns over lack of complementarity and coordination between the WPPC Law and the Water Law,
- Administrative coordination.
- Proposed revisions to the WPPC Law

For the overall **legal framework** we have provided broad recommendations on how the legal framework should be modified to reflect contemporary requirements for internal consistency and coordination. This is a broad area and we have not attempted to draft specific text as it is well beyond the terms of this TA project.

For the **coordination of the WPPC Law and the Water Law** we provide guidelines on those areas that require urgent attention. Because this involves two ministries we have not provided specific legal text. However we do recommend that this issue be dealt with as a matter of utmost importance by a State Council Standing Committee of the two ministries (refer to Administrative Coordination).

For **Administrative Coordination** we have dealt both with national and basin-level coordination. In both cases we follow international precedent in making specific recommendations that would work in the Chinese context.

For the **WPPC Law** we have identified a variety of areas for which new text is required in the law. Our recommendations include specific text for these new and/or revised Articles of the WPPC Law.

8.2. Fundamental Principles

In developing our recommendations for transjurisdictional water pollution we have considered the following fundamental principles that should apply in developing law in PRC.

- Provide an efficient and rational mechanism to address the issue of transjurisdictional water pollution that is consistent between the various laws.
- Concurrent with institutional and legislative reform now occurring in China, the use of foreign precedents and examples should be evaluated for their applicability in the Chinese context.
- Current conflicts and contradictions between, in particular, the WPPC and Water Laws and their Implementing Rules need to be corrected and coordinated.
- Definition of terms should be consistent between these laws.

- Promote a change of the nature of the law from statements of principle to more exact stipulations of actions that provide clear guidance to implementing agencies at national and lower levels and provide a clear basis for judicial decisions on matters brought before the courts.
- More clearly define the nature of measures for implementation and supervision so that the roles of different agencies are clear and consistent between the two major laws.
- Build into the WPPC law a system of checks and balances to enhance accountability[40] of agencies and officials, to reduce arbitrary actions arising from lack of clarity in the law, and to effectively punish officials who break or willingly do not enforce the law.
- Enhance the role of the public in environmental issues.
- Recommend changes in institutional structures that will enhance transjurisdictional water resources and pollution management, and which will provide guidance to future changes in national legislation on basin-wide management.
- Recommend mechanisms to achieve closure in matters involving disputes and other administrative decisions.

8.3. Overall Recommendations on State Legislation

During the project all relevant state legislation was reviewed. However, the two primary legal instruments of concern for transjurisdictional water pollution management are the WPPC Law (1996) and the Water Law as amended in 2002. National legislation for water management and, indeed, for other natural resource management concerns, tends to suffer from lack of detail in comparison with western legal instruments. This becomes a major impediment both to interpretation and implementation of the law. We note, in particular, that the legal framework tends to be drawn up to suit a particular ministry with the result that the cross-linkages between laws that are found in western legislation are not contained in PRC legislation. This produces conflicting views of meaning and mandate and, in the case of the water and pollution sector, leads to inefficiency and lack of effectiveness.

Table 8.3 outlines the general legislative issues that will be dealt with in greater detail in following tables. These issues mainly refer to the Water Law and the Water Pollution Prevention Control Law insofar as these are the main legal instruments that deal with transjurisdictional water pollution and water resources management. These two laws suffer greatly from lack of clarity, lack of detail in regards to process and procedure, and lack of common terminology. For most of the issues identified in Table 8.3 further detail is provided in following tables.

[40] Accountability is the action of making officials responsible for discharging the duties entrusted to them. This implies that there is a consequence to the officials who do not exercise their duties and responsibilities.

Table 8.3 Issues of General Legislative Concern

Existing Problems	Revision Proposals
LACK OF CROSS REFERENCING Legal stipulations on water environment management are found in various relevant legal documents. Conflicts, overlaps, and contradictions exist among a number of State laws.	A careful study on this should be conducted to overall consider the relevant laws, and make overall revisions, rather than merely revise a certain law from a certain perspective. The foreign precedent is the fact that all laws are extensively cross referenced to ensure there is no overlap and laws are consistent with each other.
LACK OF DETAIL The State legislation concerning transjurisdictional water environment management is mostly too principle-oriented and lacks detailed stipulations.	There several ways to approach this: 1. Directly revise the law itself and add detailed stipulations. 2. After the law is decreed, implementation details should be developed in time to enable the legal principles to be detailed and implemented in a timely manner. 3. Develop a framework law that enables creation of modern river basin organizations. This is consistent with international examples. 4. Develop specialized basin level legislations concerning important river basins, such as the Yellow River Regulations, the Yangtze River Regulations, etc. This is not in general use internationally.
IMPORTANT OMISSIONS In transjurisdictional water environment management, the national laws are silent on important areas e.g. how to legally define a transjurisdictional pollution event and the actions that can occur following such an event.	To revise the laws to include the corresponding content with sufficient detail to implement appropriate actions.
LACK OF MEASURES TO ENSURE ACCOUNTABILITY There are many instances where officials do not respond to administrative orders, to disputes, to pollution events, etc. or fail to enforce the law. This is closely related to unclear legal regulations, lack of accountability mechanisms, lack of transparency in administrative processes, and insufficient involvement of the public.	The national legislative framework should be strengthened by including administrative processes and mechanisms for enhancing accountability of officials. Penalties should be introduced for officials who act irresponsibly or fail to enforce the law.

Existing Problems	Revision Proposals
LITTLE EMPHASIS ON PROCEDURE At present, some State laws have too few implementation clauses. The State laws concerning transjurisdictional water environment management mainly are substantive legislation, with little reference to procedures. Therefore, the objectives of the substantive legislation are difficult to realize. For example, in the law the existence of disputes is recognized, however, the procedure of dealing with disputes is so general that it is not useful in many situation. For example, there are no stipulations on how the disputes litigants apply for the settlement, what steps and procedures to follow, how the verdicts are made, the deadline for a petition or an appeal if refusing to accept the settlement, conditions for arbitration, role of the courts, etc.	It is recommended that in the relevant State laws like *Water Law* and *Water Pollution Prevention and Control Law*, more detailed clauses on procedures be added to address specific issues. It is recommended to develop specialized Measures or Statutes concerning Settlement of Environmental Disputes, including contents on pollution from air, water, noise, solid waste, etc. In such a way, cost on legislation and law enforcement can be reduced to some extent.
NO PUBLIC INVOLVEMENT Involvement of the public has started to receive attention in recent years. However, the WPPC law in general, and legislation concerning transjurisdictional water pollution in particular, lacks clauses on the role and rights of the public.	It is recommended that State legislation, not only the W*ater Law* and *Water Pollution Prevention and Control Law*, but also other relevant laws, should include detailed clauses on the roles and rights of the public, including public involvement in planning and management. In transjurisdictional water environment management, the public should have a right of redress in cases where the responsible administrative agency fails to perform its duty under the law.
AMBIGUITIES LEAD TO DIFFERENT INTERPRETATIONS For river basin pollution management, currently there are ambiguities in national laws and high-level policy documents that lead to different interpretations of roles and responsibilities of the environment and water departments. This creates confusion and incompatible responsibilities within and between the various basin-level agencies.	*Water Law* and *Water Pollution Prevention and Control Law*, as well as other relevant laws and documents should be revised to clearly specify various departments' responsibilities and their interactions with each other.

Existing Problems	Revision Proposals
UPSTREAM / DOWNSTREAM EQUITY The issue of transjurisdictional water pollution, to some extent, is an equity issue insofar as it impacts on the rights of upstream jurisdictions to develop. In particular, in many river basins, the economy of upstream jurisdictions is less developed than that of lower reaches. Special measures are required to compensate upper reaches and to promote less polluting activities.	There are several steps in this compensation process. 1. To address the issue of development in the upper reaches, an appropriate economic compensation mechanism should be established to promote appropriate economic development on the upper reaches and to compensate upper jurisdictions for incremental costs incurred to achieve levels of water quality protection that are more than those that would normally be achieved by following the requirements of the WPPC law. This might be accomplished through a basin fund, through financial transfers from the central government, loans at preferential rates, etc. 2. Based upon a transjurisdictional water quality standard, upstream jurisdictions that have polluted downstream jurisdictions shall make compensation to downstream jurisdictions. This must also take into account mechanisms for determining pollution from one side to the other side of the river where two provinces occupy either side of the river.
DATA SHARING At this time, data sharing between ministries is difficult for technical reasons and due to administrative policies of the two ministries. Also, public rights to access to information and data are not clearly defined so that information access is now entirely arbitrary, inconsistent between administrative units on the classification of data into categories such as “secret” or ‘confidential”; and lack of uniform policies on pricing and sale of data.	Revision of the current laws, including Water Pollution Prevention and Control Law and Water Law, and related administrative practices is required to establish a transparent system for sharing data between ministries and to make data and information available to the public and other working groups. This is essential to ensure that the government is held accountable for its actions and protects the legal rights of citizens. The WPPC Law needs to be more specific on what types of data are considered confidential and data that should be open to the public. Data used to make water quality assessment should be in the public domain as well as the interpretation reports. This permits public scrutiny of water pollution assessment activities and provides for public accountability.
LACK OF COMMON ASSESSMENT METHODOLOGIES When a transjurisdictional pollution event occurs and which causes economic loss or damage or has public or environmental health impacts, there is a lack of common assessment methods that can allow the two jurisdictions to arrive at a common understanding of the causes and effects as a basis to calculate damages.	In the relevant laws, a common methodology should be identified for identification and assessment of pollution damage. There should be provision for intervention by an authoritative neutral assessment agency at the request of one of the parties so as to provide true and accurate information in more complex situations. Establishment of accredited dispute resolution centres to provide neutral dispute resolution and mediation may be desirable. Such centres would be available to provide dispute resolution at the request of one of the disputing parties.

8.4. Administrative Coordination

8.4.1. The Issue

Poor administrative coordination between the water and environment departments is a root cause of many of the problems of water resources and water environment management in PRC. This problem has been growing since the accession by SEPA to ministry status in 1998 and is a problem well known to the Chinese Government and to other impartial observers such as the World Bank, the Asian Development Bank, etc. It impacts both at the national and river basin level and has legal, administrative and operational consequences. These consequences are extremely serious and effectively prevent the full realization of national water resources and water environment goals.

This problem has been dealt with in other countries by senior level coordination committees both at national and basin levels, that serve to achieve common goals for the public good, deal with inter-departmental disputes, coordinate relevant laws, and eliminate wasteful duplication of activities. While this is, fundamentally, about the distribution of power, the solution is not to eliminate or combine departments or laws, but to achieve an equitable and cooperative framework within which the two departments can work creatively together for the good of the Chinese people. This is the practice in many western countries where several agencies, such as the US Environmental Protection Agency, the US Geological Survey (for all hydrology), and the Corps of Engineers, work closely together to achieve common goals and implementation procedures. In Canada, there is strong administrative coordination at the Ministerial level for all environmental and resource departments to ensure that laws and practices are strongly coordinated. At an operational level, Environment Canada works in harmony with Natural Resources Canada on resource management, and with Health Canada on matters of environment and public health.

Table 8.4.1 Administrative Coordination

Existing Problems	Revision Proposals
POOR ADMINISTRATIVE COORDINATION Water resources and water environmental management are now such a major issue for the PRC that the present lack of effective administrative coordination by SEPA and MWR can no longer be ignored by the State Council. This has both national and basin level consequences.	The following national and basin level requirements for improved administrative coordination should be a priority for the State Council. These are consistent with practice in western countries and will, in the short-term resolve many of the current problems in water and pollution management. In the longer-term, it will establish procedures for a more integrated approach to water management.
Ministerial Level	
	In many western countries the linkage of water quantity and quality is so important that it is coordinated at the State level by a standing national Committee comprised of ministers of relevant departments and chaired by a vice premier. This committee is responsible for effective coordination of water policy and, in some countries, includes natural resource policies. Such a coordinating body existed until 1998 when it was abolished in China. The "joint meeting system" can deal with specific problems of coordination but cannot deal with ongoing issues on a routine basis. It is recommended that, initially, a **"Ministerial Joint Committee"** be established, chaired by the Vice Premier, to address the coordination between the two ministries. The first major responsibility of this high level committee should be to harmonize the WPPC and Water Laws, and to address the many technical, policy, planning, and coordination issues that currently exist between the two ministries and as outlined in the following tables. In addition to high level policy coordination, there are many practical issues of coordination that need to be resolved, including many technical issues such as compatibility between water function zones and water environment functions zones, compatibility of data and data sharing, legal status of data within and between ministries, assessment techniques, etc. Terms of Reference that describes the functions of the Ministerial Joint Committee are provided below.

Existing Problems	Revision Proposals
Basin Level	
It is not the role of this TA project to recommend a basin-level administrative structure, however the current basin management situation in PRC (except for the Huai River basin) leads directly to transjurisdictional pollution problems due to: a) River Basin Organization (RBO) is part of only one ministry (MWR) and has no accountability to SEPA. b) No representation in RBO by basin stakeholders. c) RBO has no jurisdiction for pollution control or transjurisdictional pollution management, only the responsibility to report monitoring data from provincial boundaries. d) No specific accountability of local governments for implementing administrative orders. e) lack of planning coordination between SEPA and MWR. f) Since 2002, SEPA is no longer represented at the basin level. g) WRPBs report pollution problems to SEPA but there are no provisions for an accountable process for an appropriate and timely response leading to a solution to the problem.	Modern river basin management in western countries is carried out by river basin organizations (RBOs) that are independent of specific ministries, representative of the basin stakeholders, and have planning, reporting, and coordination as their main responsibilities. RBOs normally rely on existing departmental structures to carry out operational activities such as hydraulic and hydrological works and waste control management according to the approved basin plan, and have no direct supervisory power over these operational activities or operational departments. We propose two mechanism for basin level coordination and management. 1. As part of the planning process (see Basin Planning in Table 3.1 for greater detail) we recommend a **Joint Planning Working Group** of the departments of water resources and environment, for the purpose of developing an integrated, comprehensive and operational river basin plan. This is a working level committee and exists only to ensure that an integrated plan is developed. Membership of this committee would be persons with operational experience. 2. Until such time as the River Basin Organizations are changed to a more representative and independent organization, we recommend a **Leading Group** to be created, to be called the **"Joint Coordination Committee on Integrated Water Resources and Water Environment Management for the Yellow River Basin"**, comprised of the two departments and Vice Governors of the provinces, and which will serve as in an executive coordinating role. Operational responsibilities will continue with the main departments, however the Leading Group may issue directives to the RBO for water resources issues, and to the EPBs for water environment issues. Terms of Reference that describes the functions of the Leading Group at the basin level are provided below.

8.4.2. Terms of Reference for MINISTERIAL JOINT COMMITTEE on Integrated Water Resources and Water Environment Management

As noted in Table 8.4.1 the linkage of water quantity and quality is now so important in most western countries that it is coordinated at the State level by a standing national Committee comprised of ministers of relevant departments and chaired by a vice premier. This committee is responsible for effective coordination of water policy and, in some countries, includes natural resource policies. In PRC such a coordinating body existed until 1998 at which time it was abolished when SEPA was elevated to ministerial status. Since 1998 there has been no effective mechanism for resolving the many difficulties between MWR and SEPA. The current practice of the "joint meeting system", while it can deal with specific problems of

coordination, does not have the permanency required for long-term integration of water resources and water environment planning and management.

The following are proposed terms of reference for the Ministerial Joint Committee involving, mainly, SEPA and the Ministry of Water Resources.

Ministerial Joint Committee on
Integrated Water Resources and Water Environment Management

Chapter 1. Establishment

Article 1: The State Council has established a Ministerial Joint Committee (MJC) on Integrated Water Resources and Water Environment Management to promote and achieve effective integration of water resources and water environment policy, planning and management. At present, the Water Law and the Water Pollution Prevention and Control Law assign responsibilities for the ministries, departments, agencies and bureaus that administer each law but do not specify how activities under each are to interact and link to create integrated water resources management at all levels of government. Further, the two laws require effective harmonization so that they become mutually supportive with common terminology, clear and non-overlapping mandates, effective cross-referencing to eliminate ambiguities, and a common approach to the many technical issues that involve both departments.

Chapter 2. Membership

Article 2: The Ministerial Joint Committee will be chaired by a Vice Premier, as nominated by State Council, with the Ministers responsible for water resources and environment protection as permanent members. As and when decided by the Chair of the Committee, other ministers with responsibilities relating to integrated water resources and water environment management (State Planning, Agriculture, Health, etc.) may attend meetings if the agenda and topics for discussion and decision have wider ramifications than for only the water resources and environment protection ministries.

Ministers may delegate an alternate member at no lower than the level of Vice Minister. The heads of both the water resources and environment protection agencies will attend as observers and technical advisers to the Committee.

Chapter 3. Functions and Responsibilities

Article 3: The Committee's major responsibility is to oversee the coordination of the WPPC and Water laws, the harmonization of relevant activities related to those laws, elimination of wasteful duplication of effort in areas such as water quality monitoring and to harmonize the basin planning process, through better linkages between the two ministries and an appropriate degree of public involvement.

In particular, the Committee will coordinate the;

- Revision of the WPPC Law and the Water Law so that these two laws represent a harmonized and fully coordinated approach to water resources and water environment management with clear processes and procedures.
- Development of appropriate policies, strategies, procedures relating to the WPPC and Water laws with particular reference to technical issues requiring clarification such as, but not limited to, compatibility between water function zones and water environment functions zones, compatibility of data and data sharing, legal status of data within and between ministries, assessment techniques, etc.
- Development of standards, quality control and collection procedures and agreements for collecting, processing, and making readily available, water resources and water quality data and information under the control and management of both the water resources and environment protection ministries so that effective, integrated water resources planning and management can be achieved,
- Development of procedures to ensure the effective integration and linkages of water resource protection plans (as stipulated in the Water Law), and water pollution prevention and control plans (as stipulated in the WPPC law),
- Development of procedures by SEPA for the introduction of load based water pollution permitting and for trading of water pollution rights or quotas
- Development of appropriate public involvement processes in the procedures for water resources and water environment planning and management.

Article 4: The Committee will also arrange, and provide oversight, for studies to determine institutional and legal options that will achieve more effective integrated river basin planning and management in the major river basins so designated by the State Council, and in other river basins that cross provincial and autonomous region boundaries. The Committee will report to the State Council on the preferred options within one year of the commencement of the Committee's operations.

Article 5: The Committee may consider and endorse any interim river basin coordination arrangements and related administrative, planning, management and operating arrangements in any of the major or inter-provincial basins, with the aim of immediately achieving better integration of basin wide water resources and water environment planning and management.

Chapter 4. Mode of Operation

Article 6: The Committee will meet as decided by the chair. It will aim to have two meetings per year and a draft agenda for each meeting will be prepared by the Committee's secretariat for consideration by the Chair, at which stage the Chair will decide whether ministries other than the two permanent members should attend. The final agenda will be distributed at least three weeks before the scheduled meeting date.

Article 7: The Chair of the Committee may invite representatives and technical experts to attend meetings of the Committee to provide information and advice. Such representatives and experts will not participate in any decisions made by the Committee.

Article 8: The Committee will report once per year to the State Council on matters related to its functions and responsibilities and in particular as to the progress made on harmonization of the WPPC and Water Laws, and on investigations and studies into institutional and legal options to improve basin wide integrated water resources and water environment planning and management.

Article 9: If the Chair of the Committee so agrees, an annual forum or symposium in the form of a united conference may be held to discuss matters related to integrated water resources management. The Vice Governors in charge of water resources and environment protection from all provinces and autonomous regions will be asked to attend as well as any other experts and representatives that the Committee chooses to invite.

Article 10: The agenda for any annual symposium will be prepared by the Secretariat of the Committee, in conjunction with senior officials from the national water resources and environment protection agencies.

Article 11: The rules of operation of the Ministerial Joint Committee and its procedures will be determined by the Committee and will be recorded.

Article 12: The Committee may request the national water resources and environment protection agencies, either individually or jointly, to undertake investigations and planning activities related to the functions of the Committee. The two agencies will undertake this work in the same way as if each agencies' specific Minister had requested the work to be undertaken.

Chapter 5. Secretariat of the Committee

Article 13: The secretariat of the Ministerial Joint Committee is a working body responsible for preparing for meetings and ensuring that the decisions of the Committee are implemented. It will be set up on an annual rotation basis in the water resources and environment protection agencies, as decided by the Chair of the Committee and will be staffed by officials serving concurrently with normal duties in the relevant agency, together with officials from other agencies seconded from time to time, to undertake particular activities and prepare specific reports. The Chair of the Committee will decide on the staffing requirements of the Office and the position of the leader of the office, which will be held concurrently by a senior official from one of the two agencies.

Article 14: In addition to the general functions specified above, the secretariat will:

- Develop meeting agendas, keep records and carry out the routine work associated with the Committee
- Arrange for implementation, and oversight or monitoring of the response to the decisions of the Committee
- Collect, collate and analyse data and information sought by the Committee, prepare reviews and comments on the various reports and plans submitted to the Committee for comment, and prepare reports and information on institutional and legal options that could be considered to achieve more effective integrated river basin planning and management in the major river basins so designated by State Council, as well as other inter-provincial river basins,
- Process submissions and responses, and prepare proposals relating to any role the Committee may have in dispute resolution and compensation issues,
- Carry out other duties assigned by the Committee.

The Secretariat will establish and continually strengthen contacts with the national water resources and environment protection agencies to achieve improvements in the integrated planning and management of water quantity, and water quality and water pollution abatement issues.

Article 15: The Chair of the Committee shall be responsible for the interpretation of this Charter.

8.4.3. Joint Coordination Committee (Leading Group) on Integrated Water Resources and Water Environment Planning and Management in the Yellow River Basin

NOTE: This regulation/decree is written on the basis that changes to the WPPC and Water laws, or a specific framework 'River Basin Management' law – either of which could specifically provide for the creation of comprehensive river basin 'coordination and planning' organizations in the major basins in China – will take some time to pass through the formulation and legislative processes and in the interim, another mechanism is needed to allow more effective integrated river basin management to occur immediately in the Yellow River basin. This regulation/decree to be issued by state Council can be used as a model for all major basins in China.

Chapter 1 - General Provisions

Article 1: Water resources and water environment planning and management across the whole Yellow River basin is presently controlled by the provisions of the Water law and the WPPC law. Each law has detailed provisions that specify how planning for water quantity and water quality is to occur but as both laws have been prepared at different times and under the sponsorship of different ministries, close harmonization of the provisions of each law has not occurred. Yet the effective management of water quantity and water quality cannot be

separated and must be effectively linked in policy and planning aspects as well as across a whole basin, rather than separated within the various administrative governments within a basin.

Article 2: The current processes described in each law for undertaking the water resource and water environment planning within each ministry are effective. However, for water pollution in particular, these plans are mostly at a general level that reflect national planning targets and when considering a large river basin, are not related to other more specific or detailed issues such as water ecology in various river reaches, minimum flows, assimilation capacities, water quality standards at administrative boundaries, rules for load based discharge permitting or for trading in pollution quotas.

Article 3: The integration of these ministry-specific plans into an overall integrated water resources/water environment plan that applies to a whole river basin is a goal of State Council as it is realized that the problems of scarce water resources and deteriorating water quality cannot be managed and resolved as separate issues but as a comprehensive water resource management package relating to whole river basins, not just to individual administrative areas, where river basins cover more than one administration.

Article 4: The State Council has established, under the provisions of Decree -, a Ministerial Joint Committee on Integrated Water Resources and Water Environment Management. The Committee will oversee the coordination of the WPPC and Water laws, the harmonization of relevant activities related to those laws, elimination of wasteful duplication of effort in areas such as water quality monitoring and to harmonize the basin planning process, through better linkages between the two ministries and an appropriate degree of public involvement.

The Committee will also arrange, and provide oversight, for studies to determine institutional and legal options that will achieve more effective integrated river basin planning and management in the river basins that cross provincial and autonomous region boundaries. The Committee will report to the State Council on the preferred options within one year of the commencement of the Committee's operations.

Article 5: The Ministerial Joint Committee may consider and establish, river basin coordination arrangements and related administrative, planning, management and operating arrangements in any of the major or inter-provincial basins, with the aim of immediately achieving better integration of basin wide water resources and water environment planning and management.

Article 6: This regulation which creates a Leading Group to be referred to as the "Joint Coordination Committee on Integrated Water Resources and Water Environment Planning and Management in the Yellow River Basin" (YRJCC) describes the powers and responsibilities of this Joint Coordination Committee, and has been approved by the State Council for the purpose of achieving immediate improvements in integrated water resource/water environment planning and management across the whole Yellow River basin.

Chapter 2. Establishment

Article 7: In accordance with the powers and responsibilities allocated to it under State Council Decree (*reference, when available*), the Ministerial Joint Committee on Integrated Water Resources and Water Environment Management has created a Leading Group to be known as the "Joint Coordination Committee on Integrated Water Resources and Water Environment for the Yellow River Basin" to work toward achieving more effective integration of water resources and water environment planning and management throughout the basin.

The Committee will be known as the "Joint Coordination Committee on Integrated Water Resources and Water Environment Planning and Management in the Yellow River Basin" (YRJCC).

Chapter 3. Membership

Article 8: The YRJCC shall operate as a 'leading group' and consist of a representative from both the Ministry of Water Resources and SEPA at vice Minister or department head level, and the Vice-Governors from all of the provinces in the Yellow River basin. The chair of the Committee will either be appointed by the State Council or if so delegated, by the Ministerial Joint Committee (referred to in article 4 above) or alternatively, the position of chair will be filled by one of the provincial Vice Governors on the Committee after an election amongst the Committee members and subsequent approval by the Ministerial Joint Committee, for a specified period.

The members of the Committee will serve concurrently with their normal administrative duties in the central government, or within the various provincial governments within the basin.

Article 9: Alternate delegates may attend meetings to replace a member of the Committee, provided the replacement is not less than one level below the rank or seniority of that Committee member and has been delegated full power to make decisions.

Article 10: The chair of the Committee may add members to the committee from time to time, who may have particular and relevant expertise or as representatives of major water user groups, enterprises or the public.

Chapter 4. Functions and Responsibilities

Article 11: The Committee's major responsibilities are to:

- Oversee the effective integration of the ministry-specific water resource protection plans and the water pollution prevention and control plans that cover the whole of the Yellow River basin (or sub-basins within it) that are prepared by the national agencies responsible for administering the Water law and the WPPC law
- Oversight of the development of a focused implementation plan to achieve the goals and targets specified in the integrated plan

- Monitor the performance of all administrations across the Yellow River basin in effectively implementing the plan
- Promote harmonization of relevant activities related to those two laws
- Develop policies for the basin to eliminate wasteful duplication of effort in areas such as water quality monitoring and data collection
- Through discussion, the Joint Coordination Committee can hold public hearings to develop processes to encourage an appropriate degree of public involvement.

In particular, the Committee will:

- Provide oversight for the preparation of, and endorse, appropriate policies, strategies and procedures for integrating water resource protection plans (prepared by the Ministry of Water Resources) and water pollution prevention and control plans (prepared by SEPA) into an agreed integrated implementation plan that covers the whole Yellow River basin, and includes goals and targets for each province in the basin, and for each major sub-basin.
- Discuss and comment on final drafts of the integrated implementation plans when submitted by a joint working group of water resources and environment protection bureaus (see article 10 below) for compliance with national and provincial policies, goals and objectives and effective integration.
- In the case of substantial disagreement or divergence of views with the integrated implementation plan submitted jointly by the bureaus, that cannot be resolved, the Committee will gather comments from experts and the public, and will then adjust the plans if necessary, and send the plans to the Ministerial Joint Committee for consideration.
- Develop mechanisms and procedures to ensure an adequate amount of water resources and water quality data and information, necessary for effective integrated river basin planning and management, are collected and processed by all provinces in the basin and that such data and information is readily available, accessible and exchanged by all interested and concerned agencies, enterprises and groups, and in accordance with an agreed policy on data access,
- Review, the allocations of water to each province that have been made by the State Council, and recommend to the Ministerial Joint Committee any changes that are required to address current water resources and water environment planning and management.
- Discuss, debate and implement (or comment to the Ministerial Joint Committee if in disagreement) the detailed measures developed by the national water resources and environment protection bureaus for;
  - Sharing the water resources of the Yellow River between all provinces in the basin and monitoring and recording the use of these shares,
  - Facilitating temporary and permanent transfer of water shares or allocation, as may be arranged by two or more provinces
  - Procedures for water sharing during periods of drought
  - Setting the levels of sustainable ecologic or environmental flows in the river system

- Determining and implementing load based discharge permitting procedures and the trading of quotas attaching to these load based permits
- Setting sub-basin or catchment planning guidelines, particularly to address non-point source pollution, reviewing and endorsing such plans for consistency with basin wide implementation plans, and monitoring the implementation of these plans
- Develop detailed procedures and processes for assessing and resolving disputes relating to water pollution for matters between provinces that cannot be resolved by consultation and negotiation or by applying the dispute settlement mechanisms in the WPPC Law.
- Publicize the role and responsibilities of the Committee as well as the processes that must be followed for the public and other interested bodies and enterprises to make representations to the Committee
- Develop appropriate public involvement processes in the procedures for water resources and water environment planning and management.
- Oversight on the development of public awareness and school education programs and information that will encourage the 'masses' to learn more about water pollution issues and the measures that can be taken by the community to assist in improving water quality:
- Any other activities or studies that the Committee might agree that need to be undertaken to improve both integrated water resources and water environment planning and management across the whole Yellow River basin, and effective cooperation and coordination between the efforts of all provinces to implement improvements within and between the provinces.

Article 12: The Committee will have largely a coordinating role and will not intrude in the day to day operational and management role of the provincial water resources and environment protection agencies. The Committee, does, however, have the right to direct the Yellow River Basin Commission to undertake water resources management activities relating to the approved integrated implementation plan, and can request the provincial Vice Governor members on the Committee to implement various water resources and environmental management activities in the integrated plan.

Article 13: If the directions and requests of the Committee are ignored or not responded to in an open, transparent and cooperative way, the Committee will advise the Ministerial Joint Committee of the situation.

Article 14: Each provincial Vice governor on the Committee will be responsible for reporting annually, in a format agreed to by the Committee, the progress made in implementing the plan and achieving the targets and goals specified. Based on information provided, the Committee will arrange for the preparation of annual reports on the 'State (or health) of the Water Resources of the Yellow River Basin' and in particular, on improvements or further degradation in water quality, on any major polluters who contravene permit conditions and on the performance of various administrations in managing water pollution

issues in relation to agreed targets and goals, and submit to the Ministerial Joint Committee for information

Article 15: The Committee will meet at least twice annually in the form of a unified conference. More frequent meetings can be called by the decision of the Chair, or by a submission supported by more than half of the Committee members, transmitted through the Office of the Committee (see article 9). At least 75% of members, or their delegates, must attend to constitute a meeting at which decisions can be made. Decisions will be made on the basis of the endorsement of 75 % of the members attending a meeting. Major divergent views or disagreements shall be decided upon by the Chair of the Committee.

The time, location, meeting conditions and arrangements for expenses, and proposed agenda of meetings will be suggested by the Office of the Committee. Minutes of the Committee's meetings shall be made and filed for future reference, and decisions widely publicised.

Chapter 5. Office of the Committee

Article 16: The Office of the Joint Coordination Committee acts as the secretariat to the Committee and is a working body responsible for carrying out routine work. It will be set up in the provincial office – either the water resources or environment protection bureau - from the province from which provides the Chair of the Committee, in the offices of the Yellow River Commission, or as decided by the Ministerial Joint Committee if the Chair is not a provincial Vice Governor.

The officials in the office will serve concurrently with normal duties in their administering bureau. Other officials may be seconded to the office from time to time, to undertake particular activities and prepare specific reports, as agreed to by the Committee. The Chair of the Committee will decide on the position of the leader of the office, which will be held concurrently by a senior official from a provincial bureau, the yellow River Commission or as determined by the Committee.

Article 17: The office of the Committee will:

- Develop meeting agendas, keep records and carry out the routine work associated with the Joint Coordination Committee
- Implement, oversight or monitor the response to, the decisions and recommendations of the committee
- Collect, collate and analyse data and information sought by the Committee, prepare reviews and comments on the various reports and plans submitted to the Committee for comment, and prepare reports and information as to the on-going water quality of the water resources of the Yellow River basin
- Develop procedures and processes relating to the activities of the Committee
- Process submissions and responses, and prepare proposals relating to the Committee's role in dispute resolution and compensation issues, in promoting public involvement in water

resource management issues and in raising community and schools awareness of water quality and pollution matters in the Yellow river basin

- Carry out other duties assigned by the Joint Coordination Committee.

The Office will establish and continually strengthen contacts with relevant province level agencies and officials and work closely with these agencies to achieve improvements in water quality and water pollution abatement in the Yellow River basin.

Chapter 6. Basin-wide Planning and the Role of the Yellow River Joint Planning Working Group

Article 18: To facilitate the integration of the ministry-specific water protection plans (the Ministry of Water Resources) and the water pollution prevention and control plans (SEPA) mentioned above, into an integrated operational plan for the Yellow River basin, the Ministerial Joint Committee has approved the creation of a 'Joint Planning Working Group' comprising working level officials of both ministries. The specific make-up of the working group will be determined jointly by the two ministries.

Article 19: This working group will work to integrate the two ministerial plans mentioned in article 18 into a comprehensive, integrated, operation plan for the entire Yellow River basin. The integrated plan shall reflect all national planning targets, environmental and hydrological conditions, environmental flows, and standards to be achieved, and shall outline the coordination mechanisms across all government administrations within the basin that will ensure coordinated actions by basin and lower level units of central and provincial government departments and bureaus.

The working group members will remain accountable to their parent ministries and hence will not be directly responsible to the Yellow River Joint Coordination Committee but will take account of, and comply with as far as possible, the guidelines and procedures developed by the Committee for the development of an integrated water resources/water environment implementation plan.

Article 20: During the development of the integrated implementation plan there shall be adequate consultation with stakeholders in the basin, as well as with the general public, in accordance with the guidelines developed by the Joint Coordination Committee relating to public involvement in integrated river basin planning for the Yellow River basin.

Article 21: When the draft integrated implementation plan has been completed by the Joint Planning Working Group, the plan will be submitted to the YRJCC for consideration and review. The YRJCC, through its office, can directly liaise with the working group as to matters of detail or clarification or if considered necessary will seek public input or independent technical advice to assist in determining the acceptability of the plan and its compliance with national, basin wide and provincial policies, goals and objectives.

Article 22: Each member province of the Committee will review the implementation plan and make comments within the time specified by the Committee.

Article 23: The Committee will then recommend to the Ministerial Joint Committee whether the integrated implementation plan should be accepted in original or modified form, and whether it should be sent to the State Council for consideration. It is the responsibility of the ministry of water resources and SEPA to jointly submit the implementation plan to State Council, together with the comments of the Yellow River Joint Coordination Committee (YRJCC) and of the Joint Ministerial Committee.

Article 24: The approved integrated implementation plan should be valid for a minimum of five years, but may be amended from time to time if agreed to by both ministries, and the YRJCC. At the end of five years, the YRJCC must review the plan and any new policy directives from the central government ministries and develop guidelines, goals and objectives for the joint planning working group to take account of in re-defining a new implementation plan for a subsequent five years.

Article 25: The responsibility for undertaking various elements of the approved implementation plan will be clearly defined by the YRJCC. All central, provincial and basin-level governments and agencies will adhere to the plan and carry out responsibilities in accord with the timeframes specified in the overall plan. Officials who fail to implement the relevant parts of the plan without reasonable cause, may incur administrative penalties provided for in the legislation. The YRJCC shall have the right to recommend specific actions to any of the relevant ministries or their agencies and will monitor for compliance to these recommendations.

Chapter 7. Finance and Budgeting

Article 26: The YRJCC will develop a budget to support the expenses relating to its work, including the salaries and expenses of the Office of the Committee. This will be submitted to the Ministerial Joint Committee each year and a decision made as to how the budget is to be shared between the central government and the provinces in the Yellow River basin. Salaries for members of the Committee will be met by their parent administrations as they serve concurrently on the Committee and on substantive positions within national and provincial governments.

Article 27: The Committee will also study options to create and operate a 'Yellow River Basin Water Resources Protection Fund'. This fund would be used to support the implementation of projects that would improve water use efficiency, rehabilitate the health of the water resources, undertake related research and encourage enterprises, working units and private groups to adopt sustainable water use and pollution control measures. The fund would be under the control of the Joint Coordination Committee, which would develop rules and procedures for making applications for funding, the type of projects that could be considered, evaluation procedures, monitoring of use of funds and progress on projects and the auditing processes to maintain the integrity of the fund.

Article 28: The responsibility for interpretations of these regulations is with the Chair of the Joint Coordination Committee. If matters arise that cannot be resolved by the Chair, they will be referred to the ministerial Joint Committee for decision.

8.5. Recommendations on the Coordination between *Water Pollution Prevention and Control Law* and the *Water Law (2002)*

In the PRC the transition from ministerial development of law to the National Peoples Congress developing law represents an important step in institutional reform in PRC. In practice, however, ministers still retain substantial influence over the development process of laws that convey power and authority to their respective ministries. For example, the Water Law and the WPPC Law are developed by two separate committees within the NPC. This results in there being no effective means for rationalizing the many inconsistencies between the two laws. On such simple but fundamental matters such as the meaning of "water resources" there is no common understanding between the MWR and SEPA. This lead to continuing friction and occasionally, outright disputes, between the two ministries over jurisdiction. This has major negative implications for effective water resources and water environment management in PRC and is the root cause of many of the difficulties now faced in water pollution management in China because of the absence of effective coordination in matters of river basin planning, total load allocation procedures, pollution control, monitoring, etc.

In regards to areas of interaction and coordination between SEPA and MWR there are a number of issues that are relevant.

a) **Organizational Size and Technical Capacity**: MWR is an old and large department with strong vertical linkages from the local level upwards to the Minister. While provincial and local level Water Bureaus are organisations of local government, they are strongly integrated into the MWR planning and operational structure. As with most countries with strong water resources departments, there is a strong sense of professional identity from top to bottom with the MWR. In contrast SEPA was elevated to ministry status only in 1998 from a small headquarters organization with "Bureau" status and which was the Secretariat for the Committee of Environmental Protection of the State Council. It remains a very small ministry, with mainly a headquarters function with, we understand, fewer than 300 employees at SEPA headquarters. SEPA provides "functional" guidance at the local level to provincial Environmental Protection Bureaus (EPBs) which, in turn, have responsibility for local EPBs within their jurisdiction. The EPBs do not, however, report to SEPA as they work within provincial or local government and have a strong sense of identity with local government through the administrative control (appointments, leadership, etc.) by local government.
b) **Planning**: The MWR is represented in larger river basins and in some sub-basins, by a river basin commission which is an integral part of the ministry with direct line reporting to Beijing. MWR has, traditionally, had a strong planning and operational role in water

quantity management and is exercised by MWR officials at basin and lower levels. This vertical integration makes for effective water quantity management.

In contrast, basin-level planning for pollution management is mainly a headquarters activity in SEPA. Pollution planning at the basin level generally involves the allocation of national pollution reduction targets that are contained in the five-year plans, to the basin level. These are further assigned to local levels. The very limited human resources in SEPA, and small input into the planning process by local officials, has meant that pollution reduction targets are (a) often hugely optimistic and unrealisable in practical terms within the designated planning period, (b) are not effectively linked to local operating situation, (c) can not take into account other water environment planning issues such as ecological flows, and (d) cannot effectively include total load control measures that are realistic in the basin context. The fact that SEPA no longer has any significant presence at the basin level[41], and the lack of an effective coordination mechanism with the MWR, makes pollution planning and implementation within the larger context of water resources management, extremely difficult.

In western countries, planning at the basin level often becomes the responsibility of a river basin organization or, without an RBO, a fully integrated activity of the relevant departments. This integration is lacking in the PRC, mainly for lack of precise guidelines on administrative coordination and, partly, due to conflicting interpretations of ministry mandates. This can be rectified through strict coordination between the WPPC and Water Laws together with a State Council – level coordination mechanism. None of this is, in fact, radical, and reflects experience in western countries to effectively deal with integrated water management.

c) **Total Load Control**: It is clear that total load control will be the only way to achieve effective pollution control relative to in-stream water quality criteria on many, if not most, Chinese rivers. National discharge standards have been a good first step, however the total load into most rivers vastly exceeds any in-stream assimilation and dilution capacity. Article 16 of the WPPC Law prescribes total load control for rivers that cannot meet the in-stream water quality criteria when all dischargers meet prescribed discharge standards. SEPA has not yet announced a set of procedures for developing total load allocations. The American TMDL (Total Maximum Daily Load) process is instructive, both in terms of the science and in terms of the total load management process. Assimilation capacity is not only a set of natural in-stream processes, but is a design criterion in setting minimum flows that strongly effects water quantity management (e.g. where water diversions are significant, or where reservation management is required to maintain minimum downstream flows). Dilution requirements are much more simple to calculate but also require effective coordination with water quantity managers. Therefore, to be effective, total load management is something that must be designed jointly by MWR and SEPA. Currently, however, the process for doing this is not harmonized between MWR and SEPA. It is not possible for SEPA to develop any reasonable estimate of "assimilation

[41] SEPA formally withdrew from its co-leadership role of the basin-level Water Resource Protection Boards (WRPBs) in 2001 due to the fact that these are a reporting unit within the MWR.

capacity" or dilution criteria without explicit consideration of an expectable and managed flow regime, especially for minimum flows.

d) **River Basin Management**: In this TA we have been requested to provide guidance on how, in future, river basin management might be made more effective in regards to transjurisdictional water pollution. Obviously, this issue affects a larger range of transjurisdictional water management issues. It is a vexed issue for SEPA insofar as the RBOs (River Basin Organizations) are functional units of the MWR and over which SEPA has no operation control. It is a vexed issue for the MWR insofar as that department is mandated to carry out comprehensive and integrated water resources management which it interprets (correctly in our view) to include water quality. While both the Water Law and the WPPC Law refer to "integrated" planning and identify interactions between the two departments, the fact is that both tend to plan without any real involvement of the other. Clearly, this is not a viable future for Chinese water resources management. There is no simple, single way of fixing this dilemma, but involves a series of steps, many of which are identified in our report, including:

- Common understanding of terminology used in the two laws.
- Harmonization of the two laws to eliminate overlap and competition and to create two mutually supporting laws.
- Effective administrative coordination
- Basin stakeholder representation.

The issue is not new and has been resolved in many other countries through development of river basin organizations (RBOs) that are independent of specific ministries, representative of the basin stakeholders, and have planning, reporting, and coordination as their main responsibilities. RBOs normally rely on existing departmental structures to carry out operational activities such as hydraulic and hydrological works and waste control management according to the approved basin plan, and have no direct supervisory power over these operational activities or operational departments.

Practice elsewhere has effectively demonstrated that RBOs with true stakeholder representation are much better able to plan and administer integrated water resources management without taking away any overall authority from the two main departments. For SEPA, delegation of operational planning of pollution management to the RBO would ease its heavy responsibility for planning with so few staff. We note that, as of 2003, there is yet no basin plan for pollution control in the Yellow River basin. The structure and role of the RBO is dealt with more fully in Chapter 6 of this report.

a) Status quo (not recommended)

b) Specific law for each river basin (e.g. Yellow River Law). It is our view that a specific law for the Yellow River Basin, if it is to be consistent with institutional reform in China and with international practice and experience, should reflect a larger national framework legislation that sets a course towards modern, representative, and inclusive river basin organizations, is consistent with modern river basin planning and management practices, and which leaves the actual management of pollution and

water resources to those departments that have both the mandate and experience. However, if the YRCC is seeking a legal basis for cementing and/or expanding its own power and authority then, in our view, such a legal precedent would be a retrogressive step.

c) A framework law at the State Council level that enables the creation of a modern, representative, river basin organization that has planning, coordination, monitoring and reporting as its main functions, and leaving operational roles to the line departments (environment, water, etc.). Under this option the RBO would not reside inside any one State department, but would operate under their relevant laws and according to the planning and operational targets assigned by State departments to the RBO. This option follows many examples of successful river basin management in other countries.

d) As a temporary measure, until such time as the State Council changes the way RBOs are structured and managed, the example of the Huai River Basin is instructive. A "Leading Group" was formed under the State Council to directly coordinate the water resources and pollution management affairs of that basin. We feel that, while this may be effective in the short term, it is not a long-term solution insofar as it does not resolve the problem of effective integration of pollution planning and operational management into the integrated and comprehensive planning role of the RBO and does not change the reporting relationship of the RBO.

In this TA we have no mandate to propose changes in text of the 2002 revision of the Water Law. However, we have noted below the major areas of concern which, in general, are not restricted to transjurisdictional water pollution management.

Table 8.5.1: Problems and Coordination of the WWPC and Water Laws

Existing Problems	Revision Proposals
DEFINITIONS In *Water Law* and *Water Pollution Prevention and Control Law,* some terms and definitions are not precise or not sufficiently defined, or there exists possibility of different understanding. These have difficulties in understanding the legal clauses and addressing the issues. For example, "water pollution", "water environment", "water affairs", "water quantity", "water quality", "water resources" etc. lack specific definition, which should be given in the relevant laws. Another example, the definition of water pollution accidents/incidents is not clear enough.	The relevant laws should be revised to include detailed definitions. Special attention should be paid to the coordination among the laws to avoid contradictory explanations. After the terms are clearly defined, corresponding changes should be made in other relevant clauses.
RIVER BASIN PLANNING *Water Pollution Prevention and Control*	**IN GENERAL, THE TWO LAWS ARE NOT INCONSISTENT RE PLANNING; THE MAIN PROBLEM IS LACK OF CLARITY OF PROCESS AND**

Existing Problems	Revision Proposals
Law revised in 1996 and *Water Law* revised in 2002 have both strengthened requirement for **planning**. Especially for river basin water pollution prevention and control planning, water resources' comprehensive planning and special planning, there are special stipulations. For example, Clause 10 of *Water Pollution Prevention and Control Law* stipulates that water pollution prevention and control should be planned by the river basin or the region in a unified manner, and also specifies the responsible department to develop water pollution prevention and control plan for various river basins, as well as the examining and approving agencies. However, the law has no stipulations on the relation between the river basin water pollution prevention and control planning and water resources' protection planning, and their coordination. Clause 14 of the new *Water Law* stipulates that the river basin comprehensive planning should include contents of water resources protection, and that river basin special planning should include water resources protection planning. Clause 15 stipulates that the river basin's comprehensive planning should be coordinated with the environment protection planning. Clause 17 stipulates that the river basin's comprehensive planning should be jointly developed by the relevant departments (including environment protection department), and that the special planning should be developed by the relevant departments of the people's government above the county level, and sent to the people's government of that level for approval after consultation with other relevant departments of the same level. But in these stipulations, there still exists lack of clarity on coordination mechanisms which makes it difficult to adequately implement these plans. The first problem is that *Water Pollution Prevention and Control Law* and *Water Law* have some contradictions in the relevant stipulations. The relationship among the plans is not clarified leading to duplication and inconsistency. Second, there is no extensive involvement of the public in developing the plans. Without opinions of the entities and the public in the river basin, there is no mass	**REQUIREMENTS FOR EFFECTIVE ADMINISTRATIVE COORDINATION.** Water resources and environmental protection cannot be carried out independently as these are mutually interdependent. While the two laws require basin plans to be developed by the responsible ministry (a ministerial plan) with input from other ministries, there is no requirement that environmental protection planning and water resources planning be integrated into a single coordinated plan. While it can be argued that the intent of the two laws (Article 10 of the Water Law and Article 14 of the WPPC Law) is that there should be consultation, the level of interaction required to achieve a fully integrated plan is, in practice, insufficient, and the process is not defined. Therefore, the two laws need to be revised to require the necessary level of coordination that will result in an integrated and comprehensive approach to water pollution and water resources planning. To achieve this, the current process described in each law for achieving a ministry-specific plan is satisfactory. For water pollution these plans generally are at a general level that reflect national planning targets and are not related to other issues such as water ecology, minimum flows, assimilation capacities, boundary water quality standards, etc. The integrated plan would be at an operation level and provide more detailed operational guidance to local implementing officials of both ministries. Following conventional practice in western countries, we recommend the following be added to the WPPC Law, and be complemented by a parallel article in the Water Law. **Article (new)**: *"the State Environment Protection Department, together with the Ministry of Water Resources will strike a joint committee (the "Joint Planning Committee") for the purpose of integrating the two ministerial plans into a comprehensive, integrated, operation plan at the basin level for basins encompassing more than one province or for other river basins designated by the State Council. During the development of the comprehensive plan there shall be adequate consultation with stakeholders in the basin and the public. Both ministries are jointly responsible for presenting the comprehensive integrated, operational plan to the State Council for approval. The comprehensive plan shall reflect all national planning targets, environmental and hydrological conditions, environmental flows, and standards to be achieved, and shall outline the coordination mechanisms at the basin level that will ensure coordinated actions by basin and lower level units of each ministry. The comprehensive plan should be valid for a minimum of five years, and may be amended from time to time as agreed by both ministries.* *Operational elements of each ministry at the basin level and below will be responsible for implementing those parts of the plan that fall within their area of responsibility. Ministerial-level plans will form the basis for operations within the river basin by each ministry until such time as the comprehensive operational plan is approved. Officials who fail to implement the plan without reasonable cause, may incur administrative penalties provided for in the legislation."* **Note**: currently the two ministries would carry out these ministerial plans and the integration into a comprehensive

Existing Problems	Revision Proposals
foundation for realizing these plans. The third problem is that there are no stipulations on accountabilities for failing to implement or violation the plans.	operational plan. In the future, the two ministerial plans should be given to the RBO, which would develop the operational plan which, would then be approved by the two Ministries. Such a mechanism applies when the RBO is an independent organization with a mandate to carry out operational planning. (refer to Recommendation on Administrative Coordination in Table 8.4.1)
ROLE OF RIVER BASIN ORGANIZATION IN POLLUTION MANAGEMENT The Yellow River Water Conservancy Committee and the River Basin Water Resources Protection Bureau do not have jurisdiction over any aspect of pollution management or control and have no mechanism to manage water in line with pollution control requirements. The River Basin Water Resources Protection Bureau, is now a particular problem insofar as, since 2001, is currently under the leadership of only the water conservancy department instead of, as previously, under the dual leadership of both the environment and water departments.	This problem would not exist if there was a comprehensive and integrated operational basin plan, and a Joint Coordination Committee at the basin level with separate and joint accountabilities. (Refer to Recommendation above) Until such time as the RBO's are restructured in order to carry out integrated water and environment planning, we recommend the creation of a Leading Group for each RBO. The Leading Group will have a coordinating and senior executive role in operational management of the river basin and may provide directions to the RBO for water resources management purposes and to the EPBs for water environment management purposes. Specific recommendations appear below under Joint Management Of Water Resources And Water Environment At The Basin Level.
JOINT MANAGEMENT OF WATER RESOURCES AND WATER ENVIRONMENT AT THE BASIN LEVEL In China's current water environment management system, the departments of water conservancy and environment protection are the two major ones. Traditionally, the department of water resources (MWR) takes the charge of water quantity management while the department of environmental protection (SEPA) takes charge of water quality management. At present the management systems for transjurisdictional water pollution and water resources are different. According to *Water Pollution Prevention and Control Law* and *Water Law,* for water pollution prevention and control, our country exercises a combined system of unified management, and management by levels and by departments. According to the new *Water Law,* "for water resources, the State exercises a management system that combines river basin management and jurisdictional management." Contradictions exist with the two management systems above with ambiguous division of functions and unclear relationship of responsibilities and rights, which do not meet the need for	While the responsibilities of each ministry are defined in the respective laws, certain problems arise due to lack of clarity in the definition of terms. As noted above, many of this concerns will disappear if there is a common definition of terms in the two laws. A greater concern is the fact that since April 2002, SEPA is no longer represented in the basin, and now interacts only with local EPBs and not through the WRPB or any other basin-level organization. This leaves an imbalance in ministerial presence in the basin and having equal accountabilities. In the absence of a neutral, independent RBO, it is necessary to establish a coordinating mechanism at the basin level to deal with implementation of the comprehensive operational plan and the manage the day to day management issues that concern both ministries. The WRPB does not now have and has never had administrative responsibility for pollution management. It is suggested that the WRPB continue to play a monitoring and reporting role in support of the coordination mechanism noted below. A parallel situation in the Huai River Basin was resolved by establishing a Leading Group under the authority of the State Council with the same overall objectives as those described here. Leading Groups have been mandated in other river and lake basins such as Tai Hu Lake. It is recommended that the Regulation authorizing the formation of the Huai Leading Group be expanded to permit similar leading groups to be established in other river basins, or that the WPPC and Water Laws be amended to achieve the same effect. For the purpose of amending the two Laws, it is recommended that the following article be added to the WPPC Law with a similar Article in the Water Law. **Article (new)**: *"In each inter-provincial river basin or other river basins specified by the State Council, there shall be established a*

Existing Problems	Revision Proposals
transjurisdictional water pollution management. Because of separate management bodies for water resources and water environment, river basin management of water quantity and water quality has been separated. For water quality management, both SEPA and MWR have responsibilities. Moreover, in laws, these responsibilities are stated only on principles. Therefore, in practical work, disputes are very easy to occur.	*Leading Group consisting of the Ministry of Water Resources, SEPA and the Vice-Governors of the provinces of the basin. The Leading Group will operate by consensus. The chair of the Leading Group will be a provincial Vice Governor elected for a four year period by the members of the Leading Group and shall always reflect the will of the Leading Group. The Leading Group shall exercise oversight of the comprehensive operational plan and may issue directives to the RBO for those aspects that concern water quantity management, and to lower levels of the environment department for issues of environmental concern. In cases where directives are ignored, the matter may be raised to the Ministerial Joint Committee"* (that is recommended above) Terms of reference are provided for a Leading Group for the Yellow River Basin in section 8.4.3 of this chapter.
MONITORING Clause 18 of *Water Pollution Prevention and Control Law* stipulates that the environment protection department is responsible for organizing monitoring of water environment quality status of surface water bodies; the river basin water resources protection bureau of important river basins is responsible for monitoring water environment quality status of the water bodies on provincial borders in its basin, and reports to MWR, SEPA and/or the river basin water resources protection leading group. This is conflict with Clause 32 of the new *Water Law*, that "the administrative responsible department of water conservancy of the local people's government above the county level and the river basin management agency are responsible for monitoring water quality status of water function zones." Where there are water function zones within the river basin and not at provincial boundaries, there exists extensive overlap in monitoring. A further problem exists insofar as water function zones and water environment function zones are not harmonized. There are further monitoring problems at an operational level that need to be standardized and coordinated between the water and environment departments. Typical problems include: • stations are set up at different sections and sampling is conducted at different times, there are disparities in monitoring and calculating approaches. • The environment department's water quality statistics are based on river	The overlap and duplication of monitoring by SEPA and MWR reflects ambiguities in the law concerning the role of monitoring of each ministry. Monitoring by SEPA should be redefined to mean ***"monitoring of discharges and in surface water that is necessary to achieve wastewater control and environmental objectives".*** Monitoring by MWR should be redefined to mean "***monitoring to determine status and trends of ambient surface water in rivers, lakes and reservoirs, and is not directly related to pollution administration and control.***" The resolution of this issue is, however, mainly a matter of administrative practice and not one of the law. Internationally, this problem has been resolved by developing a common database system, such as STORET in the United States, in which all departments can enter and retrieve water quality information using a common system of river and lake mapping units. This would not be difficult to achieve in PRC if water function zones and water environment function zones were harmonized. It is recommended that the issue of duplication of monitoring capacity in water quality and hydrology should be addressed by the Ministerial Joint Committee. Each ministry should be required to prepare a **monitoring plan** as a basis for discussion and coordination. For the Yellow River Basin, the issue of monitoring and data sharing will be addressed in Component B of this cluster TA. We propose a new Article for the WPPC Law: **Article (new)**: *"In developing its monitoring programs, the environment department shall pay close attention to achieving economies through reduction of duplication, and sharing of information with other agencies. A monitoring plan will be prepared each year, coordinated with the plan of the water department, and presented to the Joint Ministerial Committee for approval."* A parallel article should appear in the Water Law. Because both types of function zones are interdependent it is recommended that an Article be added to each law to require coordination. For the WPPC Law this could be as follows with a comparable article added to the Water Law: **Article (new)**: "*The designation of water environment functions zones and water function zones shall be harmonized so that unified water management can be achieved."* Matters of coordination are referred to the Ministerial Joint

Existing Problems	Revision Proposals
sections and show the percentage of sections that belong to each class of water quality. In contrast the water conservancy department's statistics are based on monitored river length to show what percentage of river length belongs to which class of water quality. These approaches, while providing useful but different information, are difficult to rationalize when they produce conflicting views of the actual status of surface water pollution.	Committee (described above in Table 8.4.1) and should be dealt with through the annual monitoring plan proposed here. This is consistent with international examples that seek to ensure compatibility of monitoring programs and a basis for sharing of data.
MASS-BASED TOTAL LOAD CONTROL 1. Clause 16 of Water Pollution Prevention and Control Law as well as Clauses 9 and 10 of the Implementation Rules requires the environment department to develop methodology for implementing the key pollutants total quantity control system. This has not been done. 2. The development of total load controls requires the determination of assimilation capacity and any other in-stream characteristics such as ecologic flows requirements. In Article 17 of the WPPC the environment department has responsibility for determining in-stream standards. In Article 32 of the Water Law the water resources department is responsible for making determinations of assimilation capacity in water function zones and to provide this information to the environment department. Yet in Article 17 of the WPPC Law the same responsibility is given to the environment department for inter-provincial boundaries. The independent setting of standards by environment departments with or without input from the water resources department will lead to lack of coordination between stream standards and total loads. Although there is no provision in the WPPPC Law the environment department has undertaken calculations of assimilative capacity. There is no coordination of methodology nor specification in either law of the geographical zones that will be useful in determining maximum	The WPPC Law should be amended to provide a deadline for the State Council's environment protection department to issue the quota allocation methods for total quantity control and the implementation plan for total quantity control as required under the Law. The overlaps and conflicting requirements of the environment and water resources departments is complex. Both have legitimate reasons for seeking sole responsibility in this area. In fact, both have legal responsibilities. Therefore, the main issue is how to provide a systematic approach which is complementary and not competitive, and ensures an efficient process that can control total loads. Therefore, we recommend the following allocation of responsibilities: a) The water department will be responsible for developing total pollutant load criteria for the basin according to national planning objectives, and allocate the quota by water function zones and for any other areas deemed significant by the environment department, and shall transmit this information to the environment department. The water department will be responsible for monitoring water quality in the water function zones to ensure that water quality meets the required standards for designated water uses in the water function zones and to ensure that the load reduction strategy developed by the environment department is achieving the desired results. When water quality exceeds agreed values, the water department will notify the relevant environment department. b) The environment department, on the basis of the load quotas supplied by the water department for water function zones, shall develop and implement a load reduction plan. The environment department may carry out such monitoring as may be necessary to ensure compliance of dischargers to the load control plan.

Existing Problems	Revision Proposals
permissible loads.	
DISPUTES Clause 26 of *Water Pollution Prevention and Control Law* stipulates that "transjurisdictional water pollution disputes are settled through negotiation by the local people's governments, or settled through negotiation by their common superior people's government." Clause 56 of the new *Water Law* stipulates that "water affair disputes occurred between different jurisdictions should be dealt through negotiation; if negotiation fails, they are subject to the superior government's verdict, and the concerned parties must obey and execute it." Because of the above different legal stipulations, there has developed a conflict between the modes for dealing with water affair disputes and water pollution disputes. For water affair disputes the superior people's government can adopt the means of verdict while for water pollution disputes, it cannot. Furthermore, because the laws have not clearly identified the similarities and disparities of water pollution disputes and water affair disputes, it is likely to cause confusion in practice in dealing these two kinds of disputes.	The dispute settlement mechanism and accountabilities for achieving decisions are clearly defined in the new Water Law, but are not clear in the WPPC Law. Recommended amendments to the WPPC Law are provided in Table 8.6.1. This is primarily a problem of terminology. This should be dealt with by a common definition of terms in each law that clearly distinguishes between the two types of disputes.

8.6. Recommendations for Revisions to the WPPC Law

Our recommendations are contained in Table 8.6.1. These are in addition to revisions that are recommended in Table 8.5.1 that are common to the WPPC Law and the Water Law.

Table 8.6.1 Observations and Recommendations on Revision of the *Water Pollution Prevention and Control Law* as it Applies to Transjurisdictional Water Pollution Management

Existing Problems	Revision Proposals
LAW IS NOW OUT OF DATE Water Pollution Prevention and Control Law was revised in 1996. Since then, situations have changed. Many clauses are no longer suitable and need to be revised. This is not specific to transjurisdictional issues.	The WPPC is need of revision. Overall revision is not the task of this TA project which focuses on transjurisdictional issues.
DEFINITION OF POLLUTION Currently, within the WPPC Law, there are two main criteria for determining if action should be taken against a polluting source: One is when the provisions of the Law are violated (meaning, mainly, that wastewater discharges are in violation of the Law – eg. No permit, exceeding permit, etc.) pollution event (Articles 51-53) The second is when there is "direct loss" (Article 55) and "heavy loss to public or private property" (Article 57) or "damage" (Article 5) There is no definition of transjurisdictional water pollution that allows one jurisdiction to seek redress from another jurisdiction. Furthermore, the requirement to prove loss (or heavy loss) or damage is onerous, expensive, and is subject to interpretation. Terms such as accident, incident and pollution have different meanings and different legal consequences, but are not defined in the WPPC Law. Currently, the principal basis for seeking redress is proof of economic loss or damage.	Proof of pollution based on proof of "loss" or "damage" is no longer adequate for a modern industrial society. There are many kinds of damage that cause "loss" but which are difficult or impossible to quantify. This includes ecological damage, public health damage (morbidity and mortality), long-term problems with chronic toxicity, endocrine disruption, etc. We propose the following terminology be included as a revision to Article 60 in the WPPC Law. Article 60 contains a definition of water pollution, but which is imprecise relative to what constitutes change, damage or loss of use. We suggest this be amended to read: *"Water pollution" refers to the physical, chemical, radiological or biological status of a water body in which the physical, chemical, radiological or biological properties are inferior to approved water environment standards for the water body, or that negatively affect its intended use, endanger human health, or damage the ecosystem, or where consequent economic loss can be demonstrated."* We discriminate between "accident" ("Act of God" or "Force Majeure" in English Law) and "incident" in order to be consistent with Article 56 on waiver of liability from accidental pollution. *A "Pollution Accident" is a result of short-term, unplanned, accidental situation which cannot be predicted and is beyond the ability of authorities to control."* *A "Pollution Incident" is a short-term polluting state that is causes by unauthorized or illegal discharge of polluting substances that could have been reasonably prevented by due diligence and/or appropriate management on the part of the polluter." It may create an 'emergency' situation, if it is likely to cause severe environmental, human or economic damage"* *"Pollution Condition" refers to the long-term, ambient conditions that exist in surface or ground waters, arising from the cumulative impact of effluents and runoff from non-point sources."*

Existing Problems	Revision Proposals
INADEQUATE WATER QUALITY PARAMETERS The parameters now specified in the regulations no longer meet the needs for water quality management. An example is the lack of many trace organic contaminants that are now widely recognized as harmful to public health and to organisms. New and more progressive methodologies need to be included, such as toxicity assessment which reduce costs and increase the level of useful information. Additionally, the current reliance on indicator parameters such as COD for water quality management and planning are increasingly unsuitable in an industrialized society.	This is not specifically a transjurisdictional problem, however it reflects a law which is now out of date. The following are observations however we do not make specific recommendations in regards to revision of water quality parameterisation. This is a major task and Is not within the terms of reference for this TA project. The current water quality parameter system needs to be revised to consider pathways, fate and effects of chemicals, public and environmental health consideration of costs, etc. For the national classification system and for other situations such as transjurisdictional assessment of surface water there should be a standard set of parameters together with a unified set of procedures extending from the field to the laboratory. Threshold values for the water classes should be common to all ministries. The water quality classification system should also be expanded to reflect toxicity, and the synergistic and antagonistic effects of pollutants. It is necessary to develop the water quality objective system, water quality basic criteria and accumulative impact assessment strategies such as those in the US., the EU., Canada, etc., so as to provide more effective solutions to the problems of river pollution and transjurisdictional water pollution at a lower cost. Legislation concerning the management of toxic and hazardous chemicals should be formulated to put more emphasis in this issue.
TOTAL LOAD CONTROL The Yellow River Basin has a water resources shortage. The serious water pollution contributes to water shortage through loss of beneficial uses due to pollution. The Yellow River falls into the category noted in Article 16 which permits the application of a total load approach to pollution management. Although the WPPC Law was amended in 1996 there has yet to be developed a comprehensive set of guidelines for total load management. Fro the Yellow River, total load control has been used experimentally, but without great success due, we suggest, to lack of appropriate scientific criteria, and difficulties in monitoring for total load in effluents. We have developed specific text in this regard in the model Fen River Regulations.	To establish the legal safeguard system for total quantity control is an important guarantee for realizing total quantity control objectives. In Water Pollution Prevention and Control Law, there should be detailed and clear stipulations on total quantity control objectives, total quantity statistics, investigation and monitoring, total quantity distribution, applicable procedures, etc. In our revision, we make specific provisions for unified supervision and management mechanisms for total quantity control implementation. Specific recommendations apply to the Water Law and to the WPPC Law and are dealt with in Table 8.5.1.
NONPOINT SOURCE POLLUTION In China, non-point source pollution is now recognized as contributing to surface water pollution. However, the Water Pollution Prevention and Control Law still focuses on prevention and control of industrial pollution. While this is not specifically a transjurisdictional issue, the effects of non-point pollution have serious transjurisdictional implications.	The WPPC Law requires new Articles that deal specifically with non-point source pollution control. We propose a new framework Article as follows: Article (new): *"The State Council shall, within five years, develop a comprehensive set of regulations for the management and control of non-point sources of pollution that contribute to water pollution. The regulations shall include a focus on animal and poultry wastes, agricultural runoff of sediment, nutrients and pesticides, sources, phosphorus control in urban wastewater,*

Existing Problems	Revision Proposals
	urban runoff, and wastewater reuse. When these regulations are approved by the State Council they shall form part of the WPPC Law and its Implementing Regulations." The intent of this framework Article is to give SEPA a mandate to develop comprehensive legislation for NPS control in PRC.
TRANSJURISDICTIONAL WATER ENVIRONMENT QUALITY STANDARDS Clauses 17 and 18 of Water Pollution Prevention and Control Law stipulates the authority of the environment department to develop water environment quality standards for the water bodies on provincial borders in the important river basins identified by the State. The law does not specify that these standards shall be used as a basis for one jurisdiction to seek action against another jurisdiction.	The intent of the following article is to create legal water environment quality standards that are the basis for administrative or legal actions between jurisdictions. Normally, a violation of water environment quality standard requires only administrative action. Cases of "loss" (Article 55) may cause administrative or legal actions. The recommended provisions: Article 17 should be amended as: *"The environmental protection department under the State Council shall, together with the water conservancy administration under the State Council and the provincial people's governments concerned and in light of the utilization functions that are designated by the water resources department for water bodies of major river basins, taking into account the economic and technological conditions of the related regions, establish transjurisdictional water environment quality standards at provincial boundaries, and such standards shall be put into practice after being reported to and approved by the State Council. Transjurisdictional standards shall be established for provincial boundaries for the seven major river basins of China and for any other river basins designated by the State Council, within five years of promulgation of this regulation. Transjurisdictional water environment standards may be established elsewhere, under the same conditions, at the option of the environment department."* ***Article (new):*** *"The environment department will establish within two years of promulgation of this law, a draft methodology for determining the basis upon which violations of transjurisdictional water environment standards shall constitute a legal violation of the standard. The draft methodology, after review by other concerned ministries shall be conveyed to the State Council for approval and will become part of the Implementing Rules for this Law."* ***Note:*** *There are several approaches to the methodology for determining violation of the water environment standard. The definition of a violation must be sufficiently flexible that, for example, a single measurement of a parameter that exceeds a water environment standard does not constitute a violation. Normally, the methodology incorporates some statistical approach such as excedance by a standard error, or excedance over some period of time. There may also be the requirement for verification of the original monitored data by requirement for additional data.* **Article (new):** *"Monitoring data at provincial borders will be provided on a regular basis by the water resources department to basin environmental agencies. When a water environment standard has been violated according to the method approved by the State Council, the water resources department will immediately notify the provincial environment departments of the two jurisdictions, and the basin-level authority. The relevant level of the environment department shall immediately take any necessary actions to determine the cause of the violation and to ensure that the polluting source is properly controlled. The data*

Existing Problems	Revision Proposals
	may also be used by one jurisdiction to seek action against another jurisdiction to correct the polluting activity." *"At other transjurisdictional boundaries, the data produced by the responsible monitoring authority will be used as the basis for determining if a violation has occurred according the methodology approved by the State Council. The responsible monitoring authority will immediately notify the environment departments of the two jurisdictions, which will immediately take any necessary actions to determine the cause of the violation and to ensure that the polluting source is properly controlled. The data may also be used by one jurisdiction to seek action against another jurisdiction to correct the polluting situation."*
TRANSJURISDICTIONAL POLLUTION VIOLATIONS There is no article in the WPPC which specifically deals with transjurisdictional pollution violations. The 2001 Notice of SEPA obligates adjacent EPBs to joint investigate pollution accidents, however this needs to be included in the WPPC law.	In addition to pollution that is defined as a violation of a water environment quality standard, there is need for a provision that deals with transjurisdictional pollution accidents or incidents. **Article (new):** *"Where an individual or working unit or level of government has reason to believe damage has been caused by a transjurisdictional pollution accident or incident, they may seek actions against the other jurisdiction or working group in the other jurisdiction according to the provisions of Article (disputes)."* In regards to accidents, refer to "Pollution Reporting and Follow Up" below.
DATA QUALITY Quality control of water environment monitoring data is not specifically stated in the WPPC Law. Further, there is no provision for the legal status of a sample that is taken for evidence in legal or administrative proceedings. This is usually dealt with through a "chain of custody" protocol that guarantees the integrity of the sample, from the time of sampling, through the analysis, to final reporting of the analytical value.	The recommended provision: **Article (new):** *"The environment protection monitoring stations must comply with the provisions concerning the quality control of monitoring stations in the Metrology Law. Where specific samples are taken for control, prosecution or other legal purposes, the environment department of the State Council will promulgate with two years of this regulation, a suitable "chain of custody" procedure that guarantees the integrity of the analytical value of that sample. Thereafter, the chain of custody documentation will be evidence for determining a judgement based on the sample analysis. "*
POLLUTION REPORTING AND FOLLOW-UP In the WPPC Law, the WRPB reports pollution events to the environment department, which is to take action. Frequently the action is delayed or no action is taken, or administrative orders from SEPA are ignored by local officials.	Notwithstanding the 2001 notice of SEPA in regards to obligating EPBs to jointly investigate pollution accidents during the dry season, the WPPC Law should be amended to create accountabilities for response to receipt of a notification of a pollution situation. Accountability for response should be variable, depending on the level of severity of the pollution situation. ***Article (new):*** *Where a water resources department notifies the environment department of a pollution condition, or where a lower level of the environment department notifies a higher level, the environment department will take prompt action to investigate the situation and will notify all concerned parties within 60 days of its intended plan of action. It will issue quarterly progress reports on its investigations and the final recommendations to resolve the problem. Administrative orders to resolve the problem will be complied with by local officials. If they cannot comply for whatever reason they will inform the environment department in writing. Disputes between levels of government on resolution of the problem will be resolved according to the dispute settlement mechanisms in this law.*

Existing Problems	Revision Proposals
	In cases of pollution accidents or incidents of short term but serious or emergency nature, the environment department will, upon receipt of the notification, take immediate action and report to all concerned parties within five working days of its actions and recommendations. Administrative orders to correct the situation will be complied with by local officials within the time period designated in the order. *Officials who fail to comply with this regulation will be subject to administrative penalties described elsewhere in the Law.* (these must be added however this TA is not competent to determine administrative penalties)
ACCESS TO WATER ENVIRONMENT INFORMATION There is currently no provision in the WPPC Law for access to data and information.	The recommended provision in the WPPC Law **Article (new):** *"The water resource and environment protection departments of various levels of governments shall, in accordance with the Law and Regulations of Confidentiality and Secrecy, shall develop procedures, including transparent and uniform pricing policies, for ensuring access to water environment data, information and documentations to individuals, working units and other government departments. The responsible government agencies shall not unreasonably deny access and where access is denied must provide a written explanation to the requestor within 60 days of the request. Where the request is denied, or the department does not respond, the requestor may appeal to the next higher level of government or may appeal to the courts. The Regulations on Confidentiality and Secrecy at the level of the environment department shall be a public document."*
DISPUTE SETTLEMENT Article 26 of the WPPC Law provides that "transjurisdictional water pollution disputes shall be resolved by relevant local governments through consultation and negotiation, or resolved by the next higher government through coordination." Article 55 provides that disputes concerning compensation liabilities and amounts may be subject to the settlement by environment protection departments and the navigation sections of communication departments at the request of the parties concerned. If the parties concerned refuse to comply with the resolution decision, they may go to courts. They may also choose to go to courts directly." The overriding problem is that these administrative processes are not described in any detail, there are no requirements for deadlines for actions by administrative departments, no accountability for the decisions made, rights of appeal are not clear. The provisions for a level of government to act on behalf of numerous "victims" of a pollution incident needs clarification with clear accountabilities by action, and there is no definitive	Provisions concerning settlement of environment disputes shall be added, and more emphasis shall be put on the prescriptions concerning the procedures for resolving disputes. Recommended provisions on dispute settlement: ***Article (new) General Provisions*:** *"Transjurisdictional water pollution disputes may involve individuals, working units, or governments. Individuals or working units may seek redress directly against individuals or working units in another jurisdiction according to Paragraph 2 of this Article. Alternatively, individuals or working units may request the government at their level to act on their behalf. In this case, the government must respond with a period of 60 days and, it refuses to act, must provide a written explanation of its reasons for refusing the request."* *"For disputes between individuals and working units: Water environment pollution disputes between individuals and working units, and between different working units may be resolved through negotiation and consultation between the parties concerned. If consultation and negotiation fail, the disputes may be resolved through mediation by the People's Mediation Committee located at the place where the disputes occur. If mediation fails, any party may request that the disputes be resolved by environment protection departments or other relevant departments. The requested department must formally respond to the request within 30 days or provide a written reason for its refusal to act on the requestor's behalf. Settlement will be made through mediation, after which agreements of reconciliation may be entered into or settlement decisions may be made by the dispute resolving authorities. If mediation fails or if the settlement*

Existing Problems	Revision Proposals
mechanism for one level of government to seek action against another nor any requirement for one jurisdiction to respond to the other in a timely manner or to reach closure on the dispute. There are no sanctions or penalties for officials or agencies that do not implement decisions reached.	*decisions are refused, the parties concerned may request binding arbitration or go to the Peoples Courts. They may also go directly to courts without going through mediation or administrative formalities."* *"A transjurisdictional water pollution dispute in which the parties are a level of government shall be resolved through negotiation and consultation. If negotiation and consultation fail, the next higher level of government shall resolve the dispute through a process of mediation if requested by the disputing parties and, if mediation fails or is not requested, will issue a final binding administrative ruling on the dispute."* (FOLLOW WATER LAW RE COMPLIANCE TO THE RULING) **Specific Provisions** **Article (new)***:* *"If pollution persists during the period for resolving water pollution disputes, the victim parties of pollution may require environment protection departments or people's courts to issue orders for prohibition or reduction of waste discharge."* **Article (new)***:* *"During the period of water pollution, the victim parties concerned may request environment protection departments to conduct on site inspection and monitoring. The responsible environment protection departments shall not refuse the application of the parties concerned for inspection and monitoring but must provide a written explanation of reasons for its refusal. In case of loss of evidence caused by delay in inspection and monitoring, the environment protection departments shall compensate the parties concerned for their losses."* **Article (new):** *"Environment protection departments or other relevant departments shall coordinate to procure reconciliation agreements or make settlement decisions within 2 months after accepting the applications for dispute settlement from the parties concerned.* *The governments that have accepted the case of transjurisdictional water pollution disputes, shall coordinate to resolve the disputes or make an award within 2 months.* *In case the parities concerned refuse to comply with administrative decisions or administrative award, they shall take an action in courts within 30 days."* **Article (new):** *"In case that the parties concerned in water environment pollution accidents and having taken an action in courts are very poor, the plaintiffs shall be allowed for abatement, postpone or exemption of legal costs."* **Article (new):** *Any working units and individuals shall have the right to bring accusations in their own names against the government agencies or polluting units or individuals that have failed to perform their duties prescribed in the WPPC Law."* (PENALTIES ACCORDING TO WATER LAW) *Any working units and individuals have the right to bring accusations in courts in their own names against the government agencies that are deemed to have illegally approved the construction of projects or equipments with pollution to water environment, or have issued waste discharge permits in violation of laws and regulations."* **Article (new):** *"Prima facie evidence of a polluting condition*

Existing Problems	Revision Proposals
	as described in the legislation, or of loss or damage in the location of the victim, is the responsibility of the plaintiff. Where the source of the pollution is alleged to lie in another jurisdiction it shall be the responsibility of that other jurisdiction to carry out an investigation satisfactory to both parties. If the discharger cannot be determined, but the pollution event is found to originate in that other jurisdiction, then that other jurisdiction shall be deemed to be responsible for the pollution." **Article (new):** *"In case the discharge of pollutants has exceeded national or local waste discharge standards and has caused pollution damages to others, the dischargers shall be responsible for elimination of danger, restoring to original status and compensating for damages according to deadlines established by the responsible level of government.* *In case the discharge of pollutants has been in conformity with national or local waste discharge standards and has jeopardized others, the dischargers shall compensate the victims according to procedures established by the relevant level of government."* **Article (new):** *"The environment protection department of the State Council shall establish an independent system of water pollution damage assessment, and certify the institutions engaged in water pollution damage assessment. Where the quantification of damages cannot be reasonably assessed through the dispute settlement process described in the legislation, any party may request an independent damage assessment by a certified institution. The report produced by this institution will be used in evidence in the settlement of the dispute.* *Certification of assessment institutions shall be subject to collection of certification, and assessment costs will be in accordance with the tariff standards set by the pricing department of the State Council."*

9. SUMMARY AND CONCLUSIONS

9.1. Measures for Resolution of Transjurisdictional Water Pollution Problems

1. Enforcing Compliance to Prevent Transjurisdictional Water Pollution

Enforcement of current laws is the first requirement to resolving transjurisdictional water disputes. China has already promulgated many laws and regulations concerning water pollution. These laws are all mirrored in local legislation. Some provinces and cities have also developed regulations and directives such as the Fen River Water Pollution Prevention and Control Regulations and the Wei River Water Pollution Prevention and Control Regulations. It appears that there are significant lapses in enforcement of these laws, which is one of the fundamental reasons for pollution discharge and water quality aggravation.

2. Strengthen National and Local Legislation

A large number of transjurisdictional pollution disputes have occurred in China, however most of them have not been adequately resolved. Some of the reasons are: the lack of identified administrative procedures in the law; no legal basis for what constitutes a transjurisdictional pollution incident; the role of the courts; and many other shortcomings in the legal framework. The NPC, with the relevant departments, should develop corresponding laws and regulations to deal with transjurisdictional pollution disputes as soon as possible, so that (1) the rules and procedures are clear, and (2) arbitration and compensation can be conducted on the basis of law. Only in this way, can the basic principles of the Environment Law be carried out in practice, and both the polluting and polluted parties concerned have laws and detailed regulations to guide their acts.

As an example, early in 1994, Shandong Province promulgated *the Measures of the Shandong Province concerning the Resolution of Environment Pollution Disputes (See attachment).* The implementation of these Measures has played an important role in resolution of transboundary water pollution disputes within that Province.

A further legal issue is the lack of clarity with the WPPC Law and the Water Law concerning roles and responsibilities of SEPA and the MWR especially in regards to basin planning, integrated management, pollution monitoring, reporting and in the legal status of data for use in pollution assessment, enforcement and judicial processes. Both ministries claim jurisdiction over pollution monitoring and reporting. Not only is this hugely wasteful of resources, but leads to ambiguities in the status of information that can be used to pursue pollution incidents. This legal issue has been widely recognized in China. During the meeting session of the National People's Congress in 2000, thirty representatives including Li Chunmin proposed a bill concerning the amendment of the Water Pollution Prevention and Control Law. They pointed out the following problems in the Water Pollution Prevention and Control Law:

- There is a lack of clarification with regard to the duties, responsibilities and relationship of and between the institutions including the EPBs and water resource departments on the aspect of water pollution prevention.
- The management and operation mechanism has not taken into consideration the characteristics of each basin.

- There is a lack of compensation and restoring mechanism with regard to the losses suffered from pollution of the water bodies including rivers, lakes, and reservoirs.

In connection with the problems existing in the Water Pollution Prevention and Control Law, they made the following recommendations on the need to:

- Conduct unified monitoring and management of water quantity and water quality on the waste discharge outfall, and develop waste discharge loads in accordance with the assimilation capacity of the water body.
- Enhance coordination and communication in resolution of transjurisdictional water disputes.
- Establish and improve the compensation and restoring mechanism for polluted water bodies.

Another factor in strengthening the legal framework is the need to continue the process of revising the general perception of legal authorities and environmental governance. At present the WPPC Law is regarded as mainly the law for SEPA, and the Water Law is regarded as the law for the MWR. These laws are poorly coordinated and convey power to each ministry. Both laws, however, tend to reflect an older system that has since been replaced wherein the NPC, rather than the initiating ministry, is responsible for coordinating various departmental opinions and for drafting the final legal text. This change needs to be reinforced so that environmental laws are a collective responsibility rather than mainly an instrument for empowering one ministry.

In western countries, while individual ministries may have responsibility for developing and implementing specific laws, the legal framework is developed through widespread consultation so that laws are cross-referenced, potential conflicts and contradictions between laws (and between ministries) are removed, specific responsibilities assigned, and implementation is seen as a government-wide responsibility and not necessarily the responsibility of one ministry. This has required that ministries re-think the meaning of governance in that ministries are custodians of the law rather than owners of the law.

In summary, the main areas requiring strengthening are:

- Lack of clear and enforceable mechanisms to achieve administrative solutions to transjurisdictional pollution issues. There is a lack of mechanisms to ensure accountability of local governments for failure to comply with such orders.
- No legal definition of a transjurisdictional incident, with no clear procedures for an aggrieved province to pursue the polluting province.
- Overlapping legal mandates for monitoring and lack of clear rules on legal status of data by different agencies, including agencies within single ministries, for transjurisdictional pollution control purposes.
- Lack of comprehensive procedures for comprehensive and integrated water resources (quantity and quality) planning, management and enforcement at the basin level.

- The existing legal (WPPC) framework is exercised through provincial level governments but without a requirement that local decisions be consistent within an approved basin-wide plan.
- A legal framework which, currently, divides water quality and quantity into two laws administered by separate ministries. This is largely resolved if powers are granted to basin agencies for integrating the provisions of both laws[42].
- Compensation mechanism to achieve upstream pollution control objectives that are required by downstream jurisdictions and which are in excess of requirements under the WPPC Law.

3. Data and Information Sharing

Resolution of transjurisdictional water disputes needs accurate and timely monitoring data. According to SEPA China will speed up building of monitoring stations of key enterprises and areas, as well as the automatic monitoring network of river sections of key river basins, to guarantee the accuracy of environment monitoring data. In one or two years, SEPA will build thirty automatic monitoring stations for water quality, and will build seven automatic monitoring stations at the river sections where transjurisdictional water pollution disputes usually occur. By the end of the Tenth "Five-year Plan", China will have built a hundred automatic monitoring stations for water quality at the key river sections of major river basins. The Ministry of Water Resources is also undergoing major expansion of its monitoring program. We have observed at least one case where both ministries are installing expensive automatic monitoring equipment within a few hundred meters of each other. We understand that this is not an isolated case.

Jiangsu Province has also taken some measures on the aspect of monitoring in connection with transjurisdictional water pollution disputes. In accordance with the information provided by the Jiangsu Provincial Environment Protection Bureau in August 2001, fifty provincial level automatic monitoring stations and three mobile stations for automatic monitoring of water quality will be built in the Province, an automatic monitoring system of water quality and an alarm system for the water quality of drinking water sources shall be established preliminarily. Information concerning water quality change and waste load for trans-municipal sections of the major rivers in the Province shall be updated. As for the monitoring of pollution sources, the extant monitoring system for the existing thirty key water pollution sources shall be renovated, an automatic monitoring system for one hundred and seventy key water pollution sources shall be built, and an automatic monitoring system for water pollution shall be established in the selected twenty enterprises where trans-municipal disputes are likely to occur in the Province.

All these actions, however, do not resolve the dilemma, created in the existing legal framework, of competing monitoring systems of SEPA and MWR, limited data exchange between the two ministries, the legal status of data obtained by different EPBs within SEPA, and between SEPA and MWR, for enforcement and judicial actions in transjurisdictional

[42] The October 1, 2002 revision of the Water Law has not yet been considered in this analysis.

issues, and the lack of a clear and transparent policy on data access both by other government agencies and by the public. The failure to develop non-overlapping and mutually supportive roles of monitoring by SEPA and MWR, common data and information exchange protocols, data transparency, and a legally defined basis for data access with known costs, is a major failure of the current legal framework.

4. Strengthen Comprehensive Basin Level Management

Comprehensive basin level management is an important mechanism both for avoiding and for resolving transjurisdictional water pollution problems. In 1995, as a result of severe transjurisdictional water pollution problems, which the provincial and local governments were unable or unwilling to resolve, the "Provisional Regulations on the Water Pollution Prevention and Control of the Huai River Basin" (hereinafter called the Huai River Basin Regulations) were promulgated. The Fourth Article says: the Leading Committee for Water Resource Protection of the Huai River Basin (hereinafter called the Leading Committee), shall be responsible for coordinating and resolving significant problems concerning water resource protection and water pollution prevention of the Huai River Basin, supervising and inspecting the water pollution prevention work of the Huai River Basin, and exercising other functions and powers authorized by the State Council. The Twenty-eighth Article says: as for the transprovincial water pollution disputes of the Huai River Basin, the General Office of the Leading Committee shall investigate into and conduct monitoring for the disputes, prepare reports for resolution proposals to the Leading Committee for coordination and resolution. In accordance with the Huai River Basin Regulations, the Leading Committee is expressly authorized with necessary power to deal with water pollution problems with legally specified measures. Significantly, the Leading Committee includes the stakeholders - provincial representatives as well as representatives of SEPA and MWR, who are empowered under the legislation to take common action against polluting activities.

Although the measures taken in the Huai River Basin are not perfect, they have provided us with one model for comprehensive basin level management. These examples also show the recognition that water quality and quantity need to be managed together. The strengthening of comprehensive basin level management of water resources and water environment in the Yellow River Basin will be indispensable if future transjurisdictional pollution disputes are to be avoided. In Chapter 8 we have recommended a similar Leading Group for the Yellow River.

In regards to the proposed Yellow River Law, we are of the opinion that a specific law for the Yellow River giving power to the River Basin Organization as a functional unit of the MWR, would be a retrogressive step and set a precedent which is contrary to international experience. Alternative models exist and are outlined in Chapter 6 and as recommendations in Chapter 8. In particular, we believe that the river basin organizations of the future should be representative of their stakeholders, and have an executive and planning function whilst leaving the operational management to the relevant departments. It should have the power of reporting, monitoring of implementation progress and, as required, the power of imposing sanctions on officials that fail to carry out the plan.

5. Strengthen Planning and Coordination to Avoid Disputes

The planning that is required for comprehensive water management and transjurisdictional pollution management is poorly documented in the legislative framework. Specifically, the processes and procedures that will ensure harmonized water resources and environmental protection are lacking. We make specific recommendations concerning integrated planning in Chapter 8 that requires the formation of a working group of MWR and SEPA to develop integrated basin-wide plans.

The example of the Yangtze is instructive. According to "*The Water Resource Protection Plan of the Yangtze River Basin",* which recently passed through experts' review, the Yangtze River Basin shall be divided into several water function zones. The Category 1 of the function zones shall be further divided into the Protection Zone, Reserve Zone, Transitional Zone and Development Zone.

The Protection Zone includes key resources for water diversion, key resources for water supply and natural ecological protection zones. The Reserve Zones include the water areas that have not been fully developed but have high potential for development and utilization. The Development Zones include the areas for drinking water resources, the water for industry, agriculture, fishery, sightseeing, entertainment, transition, waste discharge control, etc.

The Transitional Zone mainly includes the areas where transprovincial water pollution disputes usually occur. The Yangtze River Basin covers eighteen provinces, cities and autonomous regions.

The most polluted river sections are concentrated in the transjurisdictional areas, mainly due to the lack of clarification in division of responsibilities of various provinces, cities, and autonomous regions. Putting all these river sections into the Transitional Zone for unified management may improve efficiency in water resource protection and facilitate overall arrangements for investments on infrastructure. This plan was developed with input from basin stakeholders, but approved by the Yangtze River Commission.

6. Resolution of Transjurisdictional Water Pollution Disputes

Administrative Coordination

Administrative coordination is essential in China, not only under current law but also is consistent with Chinese political and social culture in which administrative solutions are the preferred mechanism. For instance, Shanxi Provincial EPB has used it successfully for resolution of some of its transjurisdictional water pollution disputes with Hebei Province. In Guangdong Province, although transjurisdictional water pollution disputes are increasing daily, the water of the Tanjiang River has remained in good quality through four cities including the Enping, Kaiping, Taishan and Xinhui. That is because the leaders of the four cities have entered into an agreement concerning the protection of the water resource of the Tanjiang River, which stipulates that the leaders of the four cities shall be held responsible for water quality in the part of the Taijiang River within their jurisdiction; furthermore, water

quality will be taken into great consideration for assessing the leaders' working achievements. Tasks in connection with key waste discharge enterprises shall be assigned to each of the four cities at the beginning of each year, while inspections are organized at the end of each year. Monitoring sections for transjurisdictional water quality have been specified, and transjurisdictional water quality standards have been established for the Tanjiang River. As for the polluting projects to be constructed along the banks of the Tanjiang River, they have to be jointly assessed and approved by the four cities. The Tanjiang River therefore becomes the first of the trans-county rivers whose water quality has met standards in Guangdong Province.

Notwithstanding these successes, the procedures for administrative dispute settlement is inadequately defined in the WPPC Law, and there is no accountability to achieve closure in a dispute. Rights of individuals are not clearly defined, and there is currently no provision for independent arbitration. Further, the ability of one jurisdiction to seek legal action and damages against an upstream jurisdiction is very limited or impossible. We provide detailed dispute settlement mechanisms in Chapter 8.

Resolution of Disputes through Judicial Procedures

Under the present situation of environment law enforcement and environmental management, environmental disputes are usually handled through the initiative of the polluted parties concerned. As the polluters usually do not like to bear corresponding responsibilities, reconciliation amongst the polluted and polluting parties is rarely seen.

Most transjurisdictional disputes are dealt with through administrative processes, however the absence of provisions concerning the legal effect of administrative decisions made by environment protection departments, limits this process to the point where most decisions are not carried out. Therefore, in the absence of clear and enforceable administrative processes, the judicial process may become one of the most important ways for resolution of transjurisdictional pollution disputes in the future. However, one might also argue that this use of the courts is not only wasteful, but would be unnecessary if rules concerning administrative mechanisms were clear and enforceable. In this circumstance, the courts would mainly be involved in cases involving interpretation of the law, as distinct from enforcement of the law, for arbitration, and for determining such issues as liability and compensation in more complex cases. Recourse to the courts in transjurisdictional pollution issues should not become a substitute for enforcement of the law by local agencies on a case-by-case basis.

Certain quasi-judicial processes should be considered in the law, including legally binding arbitration of disputes by a neutral third party or by allocation of selected judges who have knowledge of the legal and technical issues in water pollution management, to arbitration boards. Power should be granted to the appropriate ministry to hold local officials accountable for enforcing legal and quasi-legal orders and decisions.

7. Institutional and Administrative Arrangements

The common use of administrative arrangements to resolve transjurisdictional water pollution issues is seen to work in China in some instances. While this is mandated, in principle, in Chinese Law, the implementation mechanisms are not defined and are mainly at the discretion of local officials. This creates difficulties in most situations and usually does not lead to resolution. Generally local governments ignore administrative decisions, as there is no requirement to do so, and few penalties for ignoring administrative orders. As this is mainly a legal problem, this is dealt with under the legal framework above.

However, there are examples in China where mutual trust, good will, and communication have been seen to work well. Local authorities should be encouraged to develop formal agreements on transjurisdictional issues within a legal framework that states for binding arbitration of disputes.

Additional institutional and administrative issues include the following:

- Lack of systematic and impartial enforcement of the existing laws is the root cause of most transjurisdictional disputes. This is, however, mainly the result of inadequacies in the existing institutional arrangements under which EBPs are financed and staffed. Protectionist local governments have an inordinate level of control over the EPBs which lack the independence required to uphold the law. This condition is exploited by polluting industries who can resist pollution control orders by appealing to local government officials for leniency.
- In the Yellow River, the YRCC operates under the MWR as a state-mandated organization without significant stakeholder involvement. This top-down exercise of power, lack of transparency and lack of stakeholder involvement or commitment, together with lack of power for developing and implementing basin wide planning and enforcement for water pollution control, makes transjurisdictional pollution disputes inevitable. Modern basin agencies either operate in a transparent planning/coordinating role, which guides, coordinates, and reports upon the roles of responsible ministries, or are delegated executive powers to implement the laws and regulations of the various ministries. YRCC exercises powers under the Water Law but not under the WPPC Law.
- Another administrative issue is the lack of transparency in data collection, and little data sharing between ministries. While this can be dealt with as a legal issue, it can be dealt with by an agreement between ministries.

APPENDICES

APPENDIX 1

List of Consultants

APPENDIX 1

List of Consultants

Dr. Edwin Ongley	Team Leader, Institutional Expert
Mr. Peter Millington	International Environmental Laws Expert
Professor Wang Xuejun	Deputy Team Leader, Environmental Impact Assessment Expert
Professor Shi Hang-Chang	Environmental Engineering Expert
Professor Zhang Xiaojian	Environmental Engineering Expert
Professor Weng Jianhua	Water Science Expert
Professor Wang Xi	Environmental Laws Expert
Professor Wang Canfa	Environmental Laws Expert
Professor Cai Shouqui	Water Pollution Prevention Laws Expert
Mr. Li Guangbing	Water Pollution Prevention Laws Expert

APPENDIX 2

List of Project Reports

APPENDIX 2

List of Project Reports

1 Zhang Xiaojian, Report On Wastewater Treatment Facilities' Performance In Shanxi Province, August 30, 2002.

2 Zhang Xiaojian, Improvement of Water Pollution Control in Yellow River Valley by Legislation and Management, September 30, 2002.

3 Shi Hanchang, The Characteristics of Water Pollution load in the Yellow River Basin, September 27, 2002.

4 Shi Hanchang, The Pollution Load and Trend of the Yellow River Basin, September 27, 2002.

5 Wang Xuejun: The Transjurisdictional Water Pollution Issue in the Yellow River Basin, July 31, 2002.

6 Wang Xuejun: The Impact of Non Point Source Pollution and Water Allocation on Yellow River Water Pollution, September 30, 2002.

7 Wang Xuejun: Analysis on the Functions and Duties of the Water Environment Management Institutions in the Yellow River Basin-on the Aspect of Water Environment Management, Especially on Transjurisdictional Water Pollution Management, June 28, 2002.

8 Wang Xuejun: Legislative Recommendations Based on the Output of Project Pollution Team (Input to Project Legal Team), September 30, 2002.

9 Wang Xuejun: Recommendations on the State Legislation to Address the Issue of Trans-jurisdictional Water Pollution, Jan 31, 2003.

10 Weng Jianhua: Water Quality Monitoring and Assessment of Yellow River, July-Spetember, 2002.

11 Wang Canfa: Review On Local Legislations concerning Water Resource Protection of the Yellow River Basin, September 1, 2002.

12 Wang Canfa: The Policy and Legislative Framework concerning Transjurisdictional Water Environment Management of China__Review on the Policies, Legislations and Administrations with Impact upon the Environment Management of the Yellow River Basin, September 30, 2002.

13 Wang Canfa: Supplementary Report: Policy and Legislative Framework of China's Transjurisdictional Water Environment Management, Jan 31, 2003.

14 Wang Canfa: Status, Problems and Countermeasures concerning China's Transjurisdictional Water Environment Management, Jan 31, 2003.

15 Wang Canfa: Recommendations on Improving and Perfecting the Policies and Legislations concerning Transjurisdictional Water Environment Management of China, Jan 31, 2003.

16 Review on the WPPC Law and the Implementing Rules of the WPPC Law (Cai Shouqiu & Li Guangbing).

17 Supplementary Report: Review on the WPPC Law (Cai Shouqiu & Li Guangbing).

18 Legislative Case Study on the Regulations concerning the Water Pollution Prevention and Control of the Fen River Basin (the Fen River Regulations) (Cai Shouqiu & Li Guangbing).

19 Recommendations concerning Legislations and Institutional Reform for Transjurisdictional Water Environment Management (Cai Shouqiu & Li Guangbing).

20 Review on the Waste Discharge Permitting System of the Yellow River Basin (Cai Shouqiu & Li Guangbing).

21 Recommendations for Perfecting Legislation of Trans-jurisdictional Water Resources Management in the River Basin (Wang Xi).

22 Report on Review of Legal Framework on Environmental Information (Wang Xi).

23 Comparative Analysis of International Practice in Transjurisdictional Water Resources and Water Pollution Management.

APPENDIX 3

List of Papers Prepared for First International Yellow River Forum

APPENDIX 3

List of Papers Prepared for First International Yellow River Forum

1 Peter Millington and Edwin D. Ongley，International Comparative Framework For Transjurisdictional Water Pollution Legislation，Jan 2003.

2 Edwin D. Ongley, Non-Point Source Management in China: a Comparative Assessment, Jan 2003.

3 Edwin D. Ongley, Transjurisdictional Water Pollution Management In China: an Overview, Jan 2003.

4 Zhang Xiaojian, Accelerate Implementation of Total Quantity Control of Pollutants in Yellow River Basin, Jan 2003.

5 Shi Hanchang, Self-purification Capacity of Rivers in Northern China - A Technical Conundrum for Water Pollution Control, Jan 2003.

6 Shi Hanchang, The Pollution Load and Trend of the Yellow River Basin, Jan 2003.

7 Weng Jianhua, Water Environment Monitoring and Water Pollution Status in the Yellow River Basin, Jan 2003.

8 Xuejun Wang & Edwin Ongley, Transjurisdictional Water Pollution Disputes and Measures of Resolution-Taking Yellow River Basin as an Example, Jan 2003.

9 Cai Shouqiu & Li Guangbing, WPPC Law and Transjurisdictional Pollution Management, Jan 2003.

10 Wang Xi, Methodological Importance of International Experience in Basin Management to China, Jan 2003.

11 Wang Canfa, Experiences and Lessons on China's Transjurisdictional Water Pollution Management-Inspirations Drawn from the Practice of Water Pollution Prevention and Control of the Huai River, Jan 2003.