PROGRAM ON NEGOTIATION AT HARVARD LAW SCHOOL

AN INTER-UNIVERSITY CONSORTIUM TO IMPROVE THE THEORY AND PRACTICE OF CONFLICT RESOLUTION

LONG RIVER

CONFRONTING THE CHALLENGES OF INSTREAM FLOW

General Instructions

The Long River watershed has experienced late summer droughts for several years. These have left water levels in the River dangerously low – almost too low to provide for instream flow, fish production, and meet basic consumptive uses. A River-management Action Team has been assembled to develop a scientifically sound instream flow action plan for the Long River. Unless the stakeholders on this team can agree on an instream flow action plan, however, it is very likely that federal regulators and the courts will have to step in and impose restrictions of various kinds.

The River management team has six members including representatives from:

- **The governor (the governor's special assistant will also represent the State's Department of Natural Resources)**
- **The State's Department of Fish and Game**
- **A nearby Tribe**
- **The Regional Water Supplier**
- **The Irrigators Group**
- **The Environment-Recreation Coalition**

A professional **mediator** has also been appointed to assist the team.

The Negotiation

Some time ago, the governor convened a Water Governance Committee ("the Committee") to coordinate water management in the state, in cooperation with local stakeholders and numerous state and federal agencies. Although the governor empowered the Committee to serve as a forum for sorting out watershed issues and formulating instream flow policies, it has had limited success thus far. Perhaps the Long River watershed situation will provide an opportunity for the Committee to demonstrate what it can do! The governor has, therefore, agreed with the Committee to give the newly assembled Long River Action Team considerable latitude and pledged that any recommendations it produces will quickly be translated into new regulations, assuming that his or her appointed special assistant signs off on the Team's recommendations.

The Committee, in consultation with the Tribe, selected a professional mediator to meet privately and confidentially with all the parties. The mediator conducted more than 40 interviews

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(something the mediator calls a Conflict Assessment) to identify who should be invited to sit at the table, what the areas of agreement and conflicting concerns of the various stakeholder groups are, and how these might be incorporated into an agenda for the Team to work on. As a result, representatives from the Committee, the Tribe, the Regional Water Supplier, the Irrigators, and a coalition of environmental and recreational groups have been invited by the governor to meet with the mediator to develop an action plan. If the Action Team can not reach an agreement on the key issues in the time provided, it is likely that instream flow policies will be imposed by federal agencies and the courts, with little input from local stakeholders.

The primary stakeholders and their key concerns are described below.

The Stakeholders

The Tribe is angry that its longstanding fishing rights are not being respected. The Tribal Council has made it clear that it will go to court to protect its fishing rights. Although the Tribe's land is not located within the watershed, it does have traditional fishing grounds along the Long River. The tribe's lawyers contend that it is entitled to significant instream flows to protect its treaty-based rights to fish and to environmental conditions that support a sufficient fish community, including *Ichthus concernus*. The courts have never had to rule on whether or not instream flow rights are attached to off-reservation fishing rights.

The **Regional Water Supplier's** long-term priority is to provide a safe and reliable domestic water supply at a reasonable cost. Recent below-average water levels, as well as possible water shortages in the summer months ahead, could threaten the Supplier's ability to meet its obligations using its junior (as compared to most irrigation allocations) water rights, especially as urban areas grow. Moreover, the prospect of more suburban sprawl or new developments in rural areas, and potential "exempt wells," could make the problem even worse. The Regional Water Supplier has applied for a permit to build a new off-stream surface storage impoundment facility. The watershed map in Appendix B shows the exact location of the site on the federally owned land in the upper watershed. The site was chosen because of its suitable geology. Any effort to move forward with the new impoundment project, however, is sure to be met by considerable public opposition. If the Supplier does not go forward with this new project, it will meet growing demand in some other way.

A group of **Irrigators** has organized to represent the small- and medium-sized farming operations in the area. Their primary crops are corn, soybeans, and produce for local markets. After a period of decline, demand for their crops has been growing steadily. The farmers depend heavily on irrigation to grow their crops during the summer months. The recent prolonged dry period has hit farmers hard and some Irrigators are concerned that emergency restrictions might make it impossible for them to survive. While the group has been willing to cooperate with instream flow management efforts to date, some farmers with senior water rights are upset about increasing pressure from new development and the possibility of new regulations that will make farming impossible. Some have threatened to dewater the stream -- if necessary-- to remind folks of everything that agriculture contributes to keeping the River alive.

Local **environmental and recreational** groups have formed a coalition. They are concerned about declining fish populations and increasing obstacles for people who enjoy the out-of-doors, including anglers, swimmers, wildlife observers, hikers, campers, birders, and canoers. Fishing attracts a great many tourists and is a substantial contributor to the regional economy. Local recreational businesses have been suffering losses as low flows have restricted boating and fishing on the River. The Coalition is going to argue that any water management or land-use planning that goes on must take the public interest into account. Otherwise, it will challenge any and all restrictive measures on the grounds that the public's interests are not being met.

The **State Department of Fish and Game (DFG)** is responsible for managing the ecosystem for the public benefit. There are several things it can do (unilaterally). It can: (1) pursue federal designation of the upper reaches of the Long River as a Wild and Scenic River; (2) decide to list *Ichthus concernus* as a state-threatened species; and (3) attempt to claim junior instream flow rights. The DFG knows, though, that an uncontested solution is most likely to result in the greatest benefits for the River system and its fish.

The **governor's special assistant**, an engineer, leads the governor's Committee. The Committee has the dual role of regulating water supply and protecting fish and wildlife. In these negotiations the special assistant therefore represents both the governor and the State Department of Natural Resources (DNR) and must be part of any agreement reached. If no agreement is reached, DNR is ultimately responsible for issuing instream flow recommendations, based on the best-available science, that respond to all the relevant stakeholder interests. For the time being, the federal agencies have been represented through their participation in the governor's Committee. However, they could intervene and supersede DNR's recommendations if needed, for example, in response to court challenges.

The Agenda

Worries about the declining *Ichthus concernus* population in the Long River have been a major impetus for taking action to protect instream flow. *Ichthus concernu*s is a spring- spawning trout that swims back upstream to spawn in the Blue Lake. It is the species in the River system with the greatest water need and it is common knowledge that the species is struggling. Its decline is thought to be the result of low flows (that prevent it from reaching upstream breeding grounds), increasing water temperatures, habitat loss, and growing pressure from recreational fishing. *Ichthus concernus* is a state fish species of special concern that some experts think should be listed as a state-threatened species. Further declines could eventually lead to its listing as an endangered species. Although biological and actual flow data on the Long River are limited, there are some data available for a relatively similar river in the state. Instream flow needs are facing competition from growing regional demand for water for domestic and irrigation uses. The possibility of new development in the upper part of the watershed would increase demand on the already strained existing flows. Please refer to the Appendices for a map of the watershed and other facts about it.

Thus, there are four issues of concern to all the parties.

Issue 1: Instream flow goals

In order to develop an action plan for managing instream flow in the Long River watershed, the parties must clarify their priorities for the River. Explicit goals will anchor the water-management plan and guide future decisions. It is important that the parties agree on realistic priorities. Based on confidential discussions with all the parties, the mediator has identified three possible options (i.e., sets of priorities and goals):

Option 1: ***Maintain and enhance the water supply***

- Top priority is to maintain flow for existing diversions and cause no further harm.
- Flow recommendations seek to maintain a minimum flow that supports fish habitat and protects the historical qualities of the River to the extent that is practical.
- Use flow recommendations to balance recreational, aquatic, and environmental uses along with downstream irrigation and municipal demands.
- Designate riparian buffer zones with voluntary land use restrictions on private land. These could include long-term habitat restoration projects such as revegetation and fencing.

Option 2: ***Protect subsistence fishery***

- Top priority is to protect subsistence fishery (i.e., necessary flows will be defined for specific segments and times of year).
- Use instream flow recommendations to protect other economic, social, and environmental values to the extent that is practical.
- Designate high-priority tracts within the watershed, in addition to riparian buffer zones. Appropriate agencies should acquire these tracts, such as the timber-owned lands in the upper watershed, through purchase or conservation easements.

Option 3: ***Restore the ecosystem to ensure a robust fishery***

- Top priority is to restore the ecosystem and achieve the full potential of the fisheries by conducting studies to determine minimum and optimum flows (necessary flows will be defined for specific segments and times of year).
- Use instream flow recommendations to protect other economic, social, and environmental values to the extent that is practical.
- Designate the upper watershed as a State Scenic Area and designate high-priority tracts and riparian buffer zones.
    - Designation of the Scenic Area by the state would preclude the Regional Water Supplier from constructing a new surface impoundment.

Issue 2: Strategies for increasing instream flows

The mediator has identified four strategies for increasing instream flows for the team to discuss. More details about these and other available tools for protecting and augmenting instream flows are presented in Appendix C and Appendix D.

Option 1: ***Water-demand management***

- Management mechanisms would not affect existing rights or existing water diversions.

  - Methods could include canal lining, changes in irrigation systems, urban- use conservation through changes in water supply delivery and return system and public education.
  - Conserved water can be legally appropriated for instream use.
- Under this option, the Regional Water Supplier would temporarily suspend its permit application for a new storage impoundment to assess supply and demand trends. It would reactivate its application if supply remained insufficient despite water-demand management.
- Estimates from Fish and Game indicate that this approach to water-demand management will not leave enough flow in the River to restore the ecosystem or support *Ichthus concernus* during late summer's low flows. Therefore, this option is incompatible with Issue 1's goals of restoring the ecosystem to ensure a robust fishery (Option 3) and protecting a subsistence fishery (Option 2).

Option 2: ***New storage in off-stream surface impoundment (including water-demand management)***

- The Supplier will pursue its permit application to build a new off-stream surface impoundment. The project would provide additional storage of about 15 million cubic meters. This would provide enough capacity to supply both projected population growth in the urban and suburban areas for the next 25 years, and instream flows.
  - Conditions will be placed on the reservoir to coordinate releases to maintain or enhance flow for instream objectives.
  - At the least, state approval will be required, so this would preclude reliance on purely local enforcement mechanisms (Option 3 for Issue 4: Enforcement).

Option 3: ***Market mechanisms (including water-demand management)***

- Leasing
  - This would involve negotiating a contract between a state entity or watershed committee and water users for use of their water rights during dry years. During low-flow conditions, consumptive water use would be curtailed, but Irrigators would be compensated for their losses. DNR estimates that enough water could be freed up so that some of this water could be used for instream flow purposes and some could be used by the Supplier to meet demand. During wet years, water would be allocated and used as usual.
- Conservation easements and transfer of existing water rights from offstream users to instream uses (voluntary).
  - Water rights will be acquired by the state or watershed committee if owners are willing to sell or donate them. These water rights could be permanently put into an instream flow program.
  - Farmers could put historical wetlands into conservation easements: by allowing fields to flood, water would later re-enter the system during the dry season as base flows.
- Under this option, the Supplier would withdraw its application for a permit for a new storage impoundment. The Supplier would require a long-term commitment from the State that under low-flow conditions, water freed up from irrigation would be used to meet its supply needs.

Option 4: ***Restrictions (including water-demand management and market mechanisms)***

- In addition to the commitments under water-demand management and market mechanisms, parties would voluntarily agree to establish restrictions on their water appropriations based on threshold levels for instream flow that should not be violated. The threshold level will be set in accordance with the goal agreed to in Issue 1.
- For example, if the goal is to protect a subsistence fishery, these restrictions would initially come into force when flows drop below the Department of Fish and Game's recommended flows for sustaining *Ichthus concernus* (see Appendix C). This level could be adjusted over time as more data are gathered.
- Under this option, the Supplier would withdraw its application for a permit for a new storage impoundment. The Supplier would require a long-term commitment from the State that under low-flow conditions, water freed up from irrigation would be used to meet its supply needs.

Issue 3: Future development

Option 1: ***Condition all future projects***

- Developers would have to submit an environmental assessment to the state or an appropriate local entity for all new development projects, and only those projects that are compatible with the instream flow objectives decided on in Issue 1 would be approved.

Option 2: ***Screen all future projects***

- The appropriate local and state entities will consider the effects of any new development project on meeting instream flow objectives in deciding whether it should be approved or denied.

Issue 4: Enforcement

Option 1: ***Federal enforcement***

- Instream flow plan will be submitted to federal agencies as a binding alternative management plan with federal control and enforcement.
- Financing requires Congressional approved.
- Must be approved through a NEPA (environmental impact statement) process.

Option 2***: State enforcement with local commission***

- Instream flow plan will be submitted to federal agencies as a binding alternative management plan with state and local control and enforcement.
- Establish Local Commission.
    - Commission will develop an Annual Operating Plan by April 15 of each year (if parties can't agree, the State Department of Natural Resources will decide, in consultation with the Water Governance Committee).
        - Stakeholders will meet and consult periodically to develop and implement this plan.

        - The plan will generally adopt an adaptive management approach in the sense that it will regularly revise goals and strategies based on findings of joint research studies and ongoing monitoring.
        - Stakeholders will develop joint research studies and monitoring.
        - Financing for instream flow augmentation and habitat improvement strategies will be submitted to Congress for approval as a settlement plan. State and local financial resources will also be made available.
        - Some activities could require a NEPA review, for example, the construction of a new storage impoundment.
    - Commission will seek to manage any land and water acquired through leasing, purchase, or transfer of title.

Option 3: ***Local voluntary agreement to protect instream flow***

- Establish Local Commission.
    - Commission will develop an Annual Operating Plan by April 15 of each year (if parties can't agree, the State Department of Natural Resources will decide, in consultation with the Water Governance Committee).
        - Stakeholders will meet and consult periodically to develop and implement this plan.
        - Stakeholders will develop joint research studies and monitoring.
        - The plan will generally adopt an adaptive management approach in the sense that it will regularly revise goals and strategies based on findings of joint research studies and ongoing monitoring.
    - Commission will seek to manage any land and water acquired through leasing, purchase, or transfer of title.
    - Financing for instream flow augmentation and habitat improvement strategies will come from state and local entities (no federal funds).
- This option cannot be used if the agreed-upon strategy for instream flow augmentation involves building a new off-stream storage impoundment, as this requires at least state approval.

Mechanics of the Negotiation

All six negotiating parties have agreed to attend today's meeting and are present. All parties have agreed to be assisted by the mediator. Once the simulation begins, the mediator will ask each player to give a brief, two-minute introduction to his or her table. Then, the mediator will review the timetable for the rest of the meeting and remind everyone about the ground rules *to which they have all agreed*. Negotiations must stop at the end of the meeting.

Common Participant Questions:

How will decisions be made within this negotiation?
If possible, decisions should be made by consensus. If a consensus cannot be reached, then a five-out-of-six vote is needed to approve a consensus action plan. The governor's special assistant must be part of the agreement.

How much information may I share with other participants?
Each participant may explain his or her goals and underlying interests to others in as much or as little detail as he or she wishes, and with as much or as little accuracy as he or she thinks appropriate. However, participants are not allowed to show their Confidential Instructions to any other player. (There's no way in real life to prove that you are telling the truth!)

How closely do I have to follow my Confidential Instructions?
Participants must adhere to their confidential mandate, even if in real life they do not share those interests or beliefs. At the same time, participants are encouraged to be as creative as possible within their constraints to develop constructive approaches to the issues.

Are side caucuses allowed?
The participants at each table are not required to remain seated together the entire time. That is, side caucuses are permitted among the parties at the table. If multiple groups are playing the game, each table should operate independently of all the other tables.

What happens in the event that the negotiators do not reach a decision?
If no agreement is reached (i.e., if no proposal receives at least four votes in addition to the governor's special assistant), the State Department of Natural Resources will unilaterally issue an instream flow strategy. It is possible that any such strategy will be challenged in court or superseded by federal agencies.

Do the participants have to stick with the policy options outlined in their instructions, or may they invent other options?
The group may invent other hybrid options as long as they are consistent with the information provided in the General and Confidential Instructions.

What is the best outcome possible?
Several creative outcomes are possible. In general, for all parties, the best outcome is one that produces an agreement and still allows each party to feel optimistic about meeting its own interests.

APPENDIX A: Long River Watershed Facts

Origin: Blue Lake
Length: 200 miles
Total drainage area: 15,000 square miles
Average exceedance flows[1]:

- Average instantaneous 90% exceedance flow = 440 cubic feet per second (cfs)
- Average instantaneous 50% exceedance flow = 915 cfs
- Average instantaneous 10% exceedance flow = 2,390 cfs

Average annual flow (based on the 50% exceedance flow) = 816,202,000 cubic meters

Population in the Watershed

- Total current population: 50,000 people
- Range of projected 10-year population estimates: 55,000-75,000
- Range of projected 25-year population estimates: 75,000-125,000
- Current population of Long City: 20,000
- Projected 25-year population estimate for Long City: 30,000-60,000

Watershed Description

Upper watershed

- Primarily old-growth forests beneficial for wildlife, hydrology, water quality, and channel processes.
- Currently no dams or reservoirs.
- Underground storage of water in the watershed is not feasible because of shallow bedrock.
- 65% of this area is federally owned.
    - A local Tribe has usual and accustomed off-reservation fishing rights on some of the federally owned land.
    - Some areas are popular spots for fishing and flat-water canoeing.
    - The Regional Water Supplier has applied for a permit to develop a new off-stream surface impoundment on a specific tract of the federally owned land that is geologically suitable (site is shown on map).
- 35% is owned privately by a timber company
    - The timber company has recently entered into discussions with a developer and is seeking to convert more of its holdings to residential use. If this happens, the ecological and water quality benefits of the forest stream will likely be lost and regional water demand will increase.

Middle watershed

- Most of the urbanized area is located in the middle of the watershed. Growth in Long City and its suburban areas has been rapid in the last 20 years, leading to concern about the effect of suburban sprawl on the depletion of water resources.
- In the past, the riverbanks here were armored to protect structures from floods.

[1] An exceedance flow is a quantity that the natural flow (flow without man-made effects) can be expected to exceed for a specified percentage of the time. The 90%, 50%, 10% exceedances show the approximate lower, middle, and upper natural flows respectively. Refer to Appendix C for the hydrographs depicting these flows.

- The Regional Water Supplier serves 20,000 people in this area through a run-of-the-River system. Last year, Long City used about 5,060,000 cubic meters of water (or roughly 250 gallons per day per person, including a 25% margin of safety).
- Wastewater re-enters the River six miles downstream from where it is withdrawn.
- Only about 60% of the water withdrawn reenters the stream due to some consumptive municipal uses and lawn irrigation.

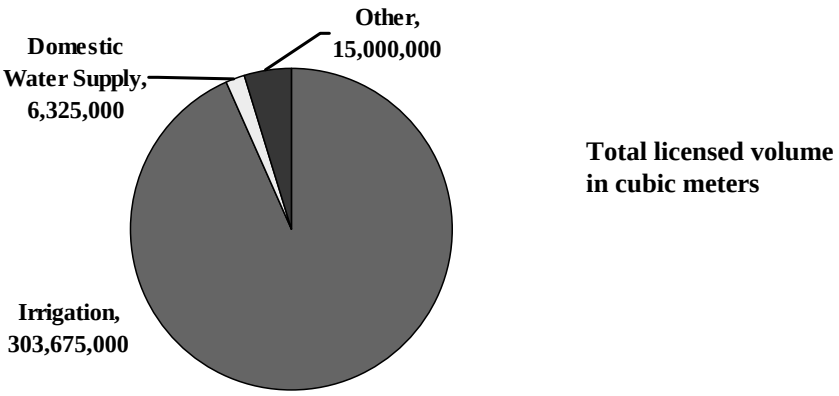
Lower watershed

- Historically the River was wider in this area; over time the River has become narrower and deeper and many former wetlands have been replaced with fields.
- Most of this land is either pasture or under irrigation.

Data on Water Licenses and Actual Use

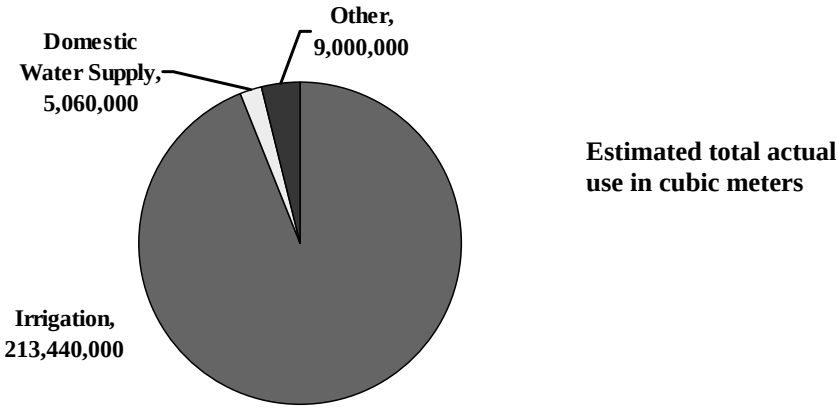
Total licensed volume: 325,000,000 cubic meters (about 40% of the annual natural flow)

- Irrigators hold licenses for 93% of water.
- Regional water supplier holds licenses for 2% of the available water.
- Various other users hold licenses for about 5% of the water.



Estimated total actual use in the last year: 227,500,000 cubic meters (28% of annual natural flow)

- Irrigators use 94% of water.
- Regional Water Supplier uses 2% of the available water.
- Various other users use about 4% of the water.



Regional Water Supplier

- Currently supplies about 20,000 customers in the Long City area.
- Its existing licenses provide enough capacity for it to supply an additional 5,000 people (with a 25% safety margin), although this could be affected by changes in flow.
- Applied for a permit for an off-stream impoundment to create an additional 15,000,000 cubic meters of storage. This would provide enough capacity for an additional 40,000 customers (60,000 total). This additional capacity should be sufficient to supply both the projected population growth in the Long City area for the next 25 years, and water for instream flows.

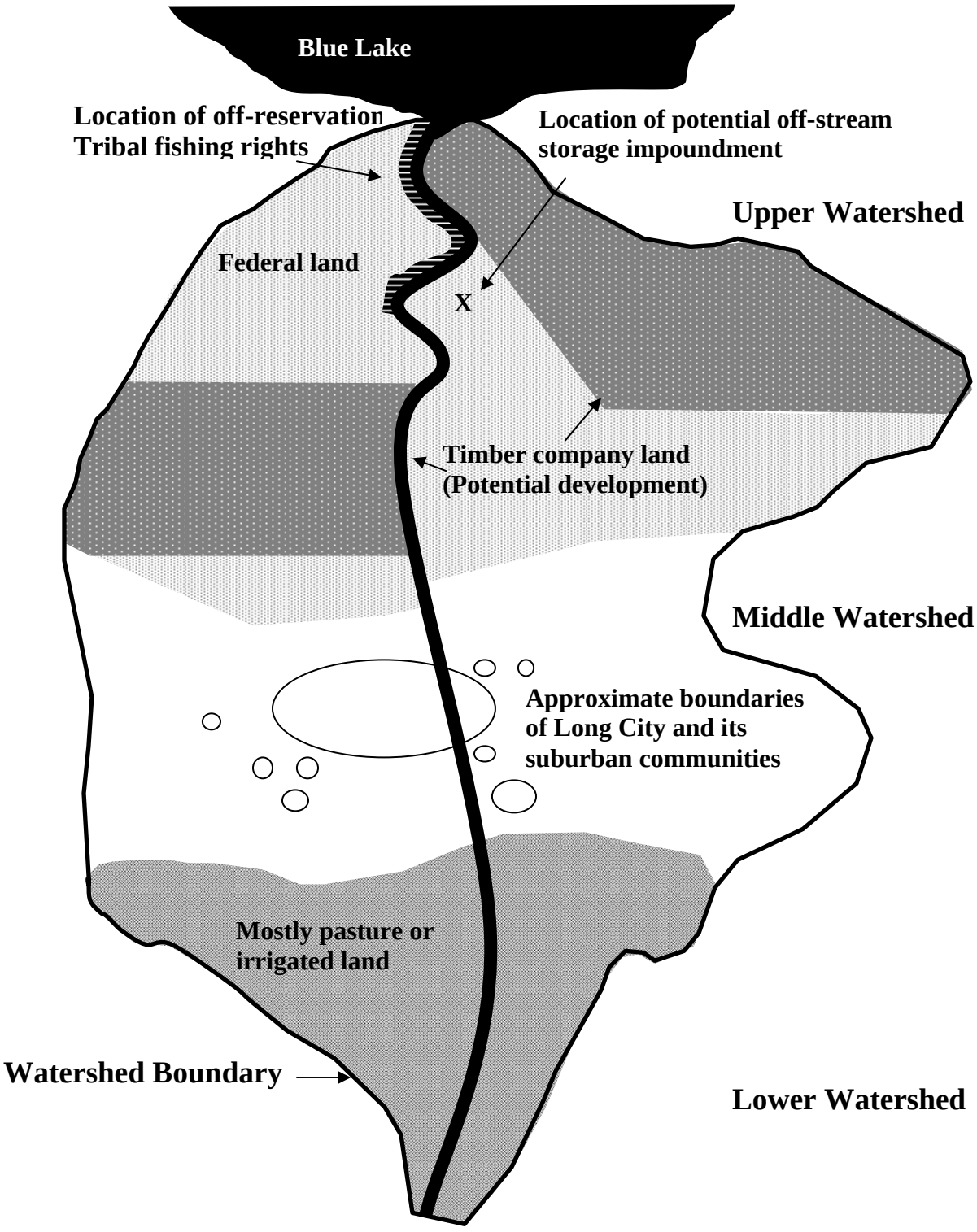
Economic Trends

Urban and suburban areas in the watershed have grown in recent years. The value of land has also gone up. The biggest employers in Long City are a small liberal arts college and a hospital. A lack of good highway connections restricts industrial development. Overall, the percentage of land in farmland has declined over the past 10 years as land has been sold to malls and large-lot residential subdivisions. Of the agricultural land, the percentage of pastureland has been decreasing, and the percentage of land under irrigation has increased. The growing urban areas have created new markets and opportunities for local specialty crops, mostly fruits and vegetables. Prices for corn and soybeans have also risen. As a result, farm income from crop output is increasing. Streamside and on-the-water recreation is a growing contributor to the local economy. In particular, recreational fishing and canoeing are becoming more and more popular.

Water Quality Issues

Human influences include point and non-point pollution from municipal and agricultural activities. Maintaining water quality under conditions of low flows is a particular challenge. Water temperatures have been increasing, which can be dangerous for the aquatic ecology and, in particular, for *Ichthus concernus*. Low flows and lack of shade in the middle and lower parts of the River contribute to above-normal temperatures.

APPENDIX B: Map of the Long River Watershed



APPENDIX C: Hydrographs

The Department of Fish and Game, in consultation with the Tribe, has prepared the following graphs. All flow levels (dots on the hydrograph) indicate flows for the entire month. The exceedance flows show estimates of the approximate lower, middle, and upper natural flows. Although actual data on the Long River is lacking, data from a nearby river, that is gauged, was used as a surrogate.

Issue 1: Instream flow goals

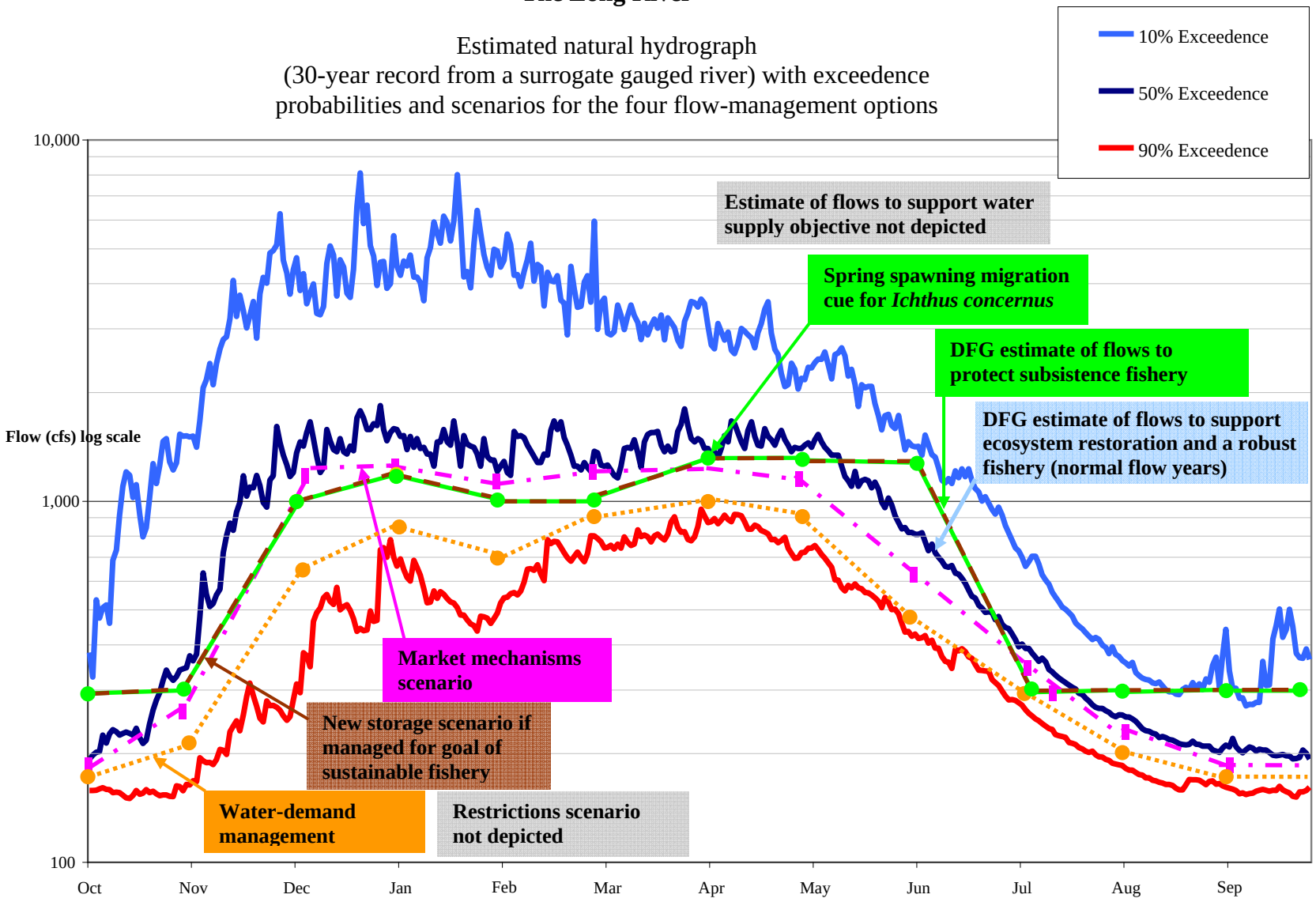
- DFG did not have enough data to map flows that would maintain and enhance the water supply (Option 1), but expects that these would fall somewhere between the flows shown under the water-demand and market mechanism management scenarios. The needed flows could, of course, vary significantly in response to changes in population and crop irrigation patterns.
- DFG estimated the flows that would be needed to protect a subsistence fishery (Option 2). This flow is represented by the light green line.
- In order to restore the ecosystem to ensure a robust fishery (Option 3), flows would be needed that track the natural hydrograph more closely. This would include considerations about timing, frequency, duration, magnitude, and rate of change of flows. In short, flows would track the 50% exceedance flow in normal years (or normal months or seasons), but could also track the 90% (in dry years) or 10% (in wet years) exceedance flows.

Issue 2: Strategies for increasing instream flows

- The orange dotted line shows the flows that could be expected under water-demand management (Option 1). DFG estimates that the water-demand management option alone is not going to keep enough water in the Long River at the right times of year to support a sustainable fish population.
- Option 2, new storage in off-stream surface impoundment (including water-demand management) could be regulated to store water when flows are above the recommended instream flows, and release additional water during dry periods when flows would otherwise drop below the recommended level. Flows could therefore be sufficient to either maintain a sustainable fishery (depicted by the dashed brown line) or to restore the ecosystem to ensure a robust fishery (not depicted).
- Option 3, market mechanisms (including water-demand management) is depicted by the pink dashed line. This strategy may provide enough flows to support a sustainable fish population most of the time.
- Option 4, restrictions (including water-demand management and market mechanisms) could prevent flows from dropping below the recommended instream flow levels. The flows under this option would therefore look like the pink market mechanism line, except that flows would not dip below an agreed-upon level. For example: if the goal of instream flow management is to protect a subsistence fishery, then the flows would not drop below the green line.

The Long River

Estimated natural hydrograph
(30-year record from a surrogate gauged river) with exceedence probabilities and scenarios for the four flow-management options



APPENDIX D: Strategies for Protecting or Augmenting Water Supplies

Water-management framework

Water rights in the Long River watershed are governed by the *prior appropriation doctrine* that gives a user a right to use water. A water right is based on the intention to use the water for a beneficial use, the presence of a diversion to convey water from the stream to the location where it is used, and the actual use of that water. The common saying "First in time, first in right" means that users with senior rights are entitled to have their rights satisfied before users with junior rights. Under this doctrine, several strategies are available for protecting or augmenting existing water supplies.

State and Local Tools

Water-demand management covers a variety of strategies designed to reduce water consumption. These include mechanisms that do not affect rights for existing water diversions, such as canal lining, changes in irrigation systems, urban-use conservation, and public education. Conserved water can be legally appropriated for instream use. However, new programs for demand management require investment capital.

Growth management tries to condition new development on demonstrating a sufficient water supply to support it. Urban growth boundaries, which separate urbanizable land from rural areas where development is limited or precluded, are one such tool. Developers can also be required to submit an environmental assessment of their projects' potential impacts on the environment and water resources. It is likely that any new upstream development in the Long River watershed will rely on exempt wells to supply domestic water. Exempt wells are not subject to the same restrictions as other water diversions and are a major concern. While any particular well may have a negligible effect on instream flow, exempt wells can have a significant cumulative effect on hydrologically connected waters.

Conservation easements are another land-use planning tool that allows landowners to voluntarily donate or sell development rights or restrictions on their land to a government entity or non-profit organization. These easements can preserve open space or be used to improve public river recreation opportunities. In some cases they may include conditions, such as allowing fields to flood, which can keep water in the system longer so that it re-enters the River later during lower-flow periods.

Scenic areas can be designated by the state. The state's policy is to provide for protection and enhancement of scenic areas of statewide significance. The policy requires that proposed actions in or outside of such areas protect, restore, or enhance the overall scenic quality of the site. Specifically, any actions may not diminish open-space areas, limit public access, impair the scenic beauty, or cause permanent damage to ecological systems. These areas are delimited by an urban-growth boundary that separates urbanizing land from rural land. The level of protection is similar to the federal "Wild and Scenic" designation.

New off-stream surface storage impoundment must meet state and federal water and environmental regulations such as the National Environmental Policy Act. It is not

uncommon for approval and construction of such projects to be conditioned on minimum-flow releases.

Water markets facilitate the transfer of water rights between willing buyers and sellers to protect instream flows. Landowners choose to participate in water markets and may prefer this approach, as compared with environmental litigation or administrative proceedings. Landowners may be compensated for leaving water in the stream through monetary payments, improvements to irrigation systems, or avoiding forfeiture provisions. Transfers may take the form of a lease, purchase, or donation. They can be split-season (allowing irrigation early in the season and leases that guarantee late-season water for other uses, in effect shortening the irrigation season), short-term (one or two years), long-term (five or more years), or permanent. Usually, only state or federal entities can obtain water rights, although private groups may be able to participate as well. Although water markets have the potential to create mutually beneficial outcomes, they are dependent on finding willing sellers. It is also often difficult to assess the monetary value of instream flows relative to other uses. When the market demand for out-of-stream uses exceeds the market demand for species protection, market mechanisms can be difficult to use to protect specific species of concern.

Voluntary restrictions. Users may voluntarily agree to restrict their water withdrawals once instream flow levels drop below a specified level. Water users may prefer such voluntary commitments rather than mandatory restrictions. In a watershed the size of the Long River, in which many community members know each other, public opinion can be a powerful enforcer of such commitments. However, since the users with an appropriation retain their right to use the water, such restrictions can be difficult to enforce legally.

Instream flow appropriations can be granted for instream flow use. However, these are typically junior to existing rights and may not be sufficient to provide water for instream purposes during prolonged dry periods. They do provide standing to challenge senior appropriators' attempts to change upstream diversions.

Federal Tools

Endangered Species Act. *Ichthus concernus* is a fish species of special concern that is being considered for listing as a state-threatened species. If the population continues to deteriorate, it could eventually be federally listed as an endangered species, which would include protections to flows necessary for its life cycle.

Native American water and fishing rights are usually protected by the federal government. Tribes are guaranteed the ability to take a meaningful share of fish. Diversions and impoundments can interfere with their ability to do so. So far, however, the courts have not ruled on the question of whether or not instream flow rights are attached to off-reservation fishing rights in usual and accustomed areas.

Public-interest water resources are held in trust for the benefit of the public. Therefore, public-interest criteria can be used to screen new appropriations or changes to existing

water rights. Considerations that should be taken into account are navigation, fishing, commerce, and general recreation.

The Wild and Scenic Rivers Act seeks to preserve the free-flowing conditions of unique streams. Fish and wildlife must be considered, and detrimental constructions such as impoundments are prohibited on rivers with this designation. The Act also contains a federal reserved-water right for a reasonable amount of water to preserve the River's unique characteristics. However, these water rights have more junior status than existing rights.