Principles for an Environmentally Sound Regional Water Plan

The National Wildlife Federation urges all Regional Water Planning Groups to give full consideration to the environmental impacts of both existing and proposed water-development projects as they develop their regional water plans. Specifically, we urge planning groups to incorporate into their plan these four basic principles:

1. Sufficient water must be available to support fish and wildlife.
2. Aggressive efforts must be made to conserve water and minimize the demand for new water supplies.
3. New water projects must avoid the destruction and degradation of wildlife habitat.
4. Both surface and groundwater supplies should be developed and managed sustainably.

How each region should apply these principles will vary with its climate, geography, population, economic base, and available water supply. In general, though, incorporation of these principles is fundamental to the development of a sound regional water plan. Each principle is discussed below.

1. Water for Fish and Wildlife

To be complete and credible, regional water plans must recognize and quantify environmental flows and must contain specific mechanisms to ensure that neither existing nor proposed impoundments and diversions impair the needed flows.

An environmentally sound water plan will explicitly recognize protection of the natural environment as a priority use of water. It will protect instream flows–the amounts of flowing water needed to support fish and wildlife resources in and along our rivers. (These flows also support various recreational and commercial activities.) It will also protect freshwater inflows for the bays and estuaries, which are needed to maintain acceptable salinity levels and supply nutrients and sediments for the estuarine areas that support marine life and other species. (Healthy estuaries are essential to our coastal economy, especially fishing and recreational activities.) Taken together, these environmental flows constitute a demand for water that must be met along with municipal, agricultural, and industrial demands.

Region-Wide Flow Assessment

In some river basins, existing authorizations for impoundments and diversions of surface water already threaten or impair environmental flows. In fact, some streams flow today only because existing water rights have not been fully exercised--a situation that is changing as unused rights are bought up by new users. As a starting point for addressing environmental flows, a comprehensive water plan must include a region-wide assessment to determine the degree of environmental impairment resulting from existing authorizations. Where environmental flows are impaired, plans should propose

measures for protecting or restoring needed flows, such as cancellation of unused rights or funding for acquisition of existing rights that could be converted to instream flow uses. In basins where existing authorizations for impoundments and diversions are more limited and environmental flows are not immediately at risk, plans would only need to ensure that future water-supply projects will not impair environmental flows. Regardless of which condition pertains, each regional plan must include an assessment of environmental flows throughout the region and specific proposals to ensure that environmental water needs will be met.

Criteria for Assessing Adequacy of Flows

Unfortunately, precise information about environmental water needs is lacking for most of the state. Where credible studies have been done on a particular river or bay system, regional planning groups should use them to quantify environmental water needs. For example, a comprehensive study of instream flow needs has been performed for the lower Colorado River. Similarly, the Texas Water Development Board (TWDB) and Texas Parks and Wildlife Department have completed bay and estuary inflow studies for several bay systems and studies are in process for several others.

Where such site-specific data are not yet available, more generic tools must be used to calculate environmental flows. In general, planning criteria should ensure that sufficient flow will be maintained at all times to support healthy fish and wildlife populations. During drought conditions, although flow levels will be diminished, impoundments and diversions of water should not cause flows in an otherwise perennial stream to cease or to drop to such low levels that fish and wildlife cannot recover quickly when the drought ends. The "environmental water needs"criteria set out in *Water for Texas,* the1997 State Water Plan, are likely the best information currently available for use in this planning effort. The TWDB has instructed regional groups to use these criteria to evaluate new projects in the absence of site-specific data. These criteria can also be applied region-wide to assess the status of environmental flows. In particular, the streamflow levels indicated as "pass-by rates" for "new direct diversions" should be evaluated for all major streams, even those unaffected by proposed new projects, to assess the impact of existing authorizations.

For future planning cycles and for the permitting of individual projects, more site-specific information and improved planning criteria will be needed to allow for more refined assessment of environmental flow conditions. However, the time to take the first comprehensive look at this issue is now. An improved understanding of the impact of water development projects, both existing and new, on environmental flow conditions is essential for comprehensive water planning.

2. Planning for the Conservation of Water

Credible water planning must include aggressive conservation efforts to minimize demand and make the most efficient use of existing water supplies.

The first mechanism for meeting water demands must be a concerted effort to reduce those demands through conservation. In Texas, water conservation is readily employed as a drought-management strategy, but is seldom used to manage overall demand. The distinction between drought management and demand management is critical to water planning, particularly given the state's anticipated population growth over the next fifty years. Fresh water is an increasingly limited resource throughout the state, and not just in times of drought. If the state is to support a population double its current size in 2050 and still protect our natural heritage, all sectors must use water efficiently all of the time.
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The water-demand projections prepared for each region by the Texas Water Development Board assume only the minimal level of water conservation required by current state law (low-flow shower heads, water-saving toilets and the like for new construction and renovations). In most regions and among all users, there is great potential to reduce demand through aggressive water conservation. Given the tremendous financial and environmental costs associated with the development of new water supplies, improved water-use efficiency must be the first approach considered for meeting projected non-environmental water demands.

Large-scale reductions in water use are possible in all sectors through the application of water conservation measures. Regional water plans should evaluate the potential for demand management and advocate aggressive conservation efforts by all users.

Municipal use. Municipal water use, now 20 percent of total water use, is expected to account for 34 percent of water use in 2050 due to population growth. The potential for conservation in this sector is enormous. By some estimates, 30 to 40 percent of the municipal water supply is used for landscape watering, much of which is done very inefficiently. The Texas Agricultural Extension Service estimates that the use of water on landscape sites–including commercial property, athletic fields, golf courses, and homes–is between three and seven times the amount needed.

Spurred by recurrent drought conditions (and inadequate treatment capacity), some cities have already achieved significant reductions in water use with relatively modest policy changes. The City of Austin has reduced per capita water use 27 percent over a 13-year period, from 220 gallons per capita per day (GPCD) in 1984 to 160 GPCD in 1997. El Paso, which instituted a conservation pricing structure among other things, has reduced its per person consumption 13% percent in 9 years, from 187 GPCD in 1990 to 163 GPCD in 1999. Despite this progress, population growth has caused overall water consumption to rise in both cities. Resource managers anticipate that additional reductions in per capita usage will be achieved in coming years.

Agricultural use. Similar large-scale improvements in efficiency can be achieved for agricultural operations. For example, low energy precision application (LEPA) irrigation systems, a highly efficient form of center pivot irrigation system, can achieve efficiency rates of 85 to 95 percent, according to the Texas Agricultural Extension Service. (This means that 85 to 95 percent of the water pumped is actually delivered where it can be used by the target plants). Drip irrigation systems can achieve 90 percent efficiency. Both the drip and the LEPA methods dramatically outperform flood irrigation systems, whose average efficiency rate is 50 percent. As of 1998, about 75 percent of total irrigated acres in the Llano Estacado Regional Water Planning Area were reported to be using center pivot systems, although the majority had efficiencies in the 75 to 80 percent range. While irrigation efficiency in the High Plains, with over 3,000,000 irrigated acres in the area, has been greatly increased over historical flood irrigation practices, much more still can be done. In other areas, inefficient flood irrigation still is widely practiced.

Industrial use. Among industrial users, who now account for 13 percent of water use, opportunities for conservation vary greatly with the type of operation. Within this sector, water reuse strategies offer potential savings, though the reuse of effluent must be balanced against the importance of returning treated effluent to its source to maintain instream flows.

3. Avoiding Damage to Wildlife Resources

Regional water plans must ensure that recommended water development projects will minimize adverse impacts to wildlife resources, particularly threatened and endangered species, wetlands, ecologically significant stream segments, and habitat in watersheds already impaired for water quality.

In addition to the potential loss of environmental flows which must be avoided as discussed above, water supply projects can cause other significant damage to both terrestrial and aquatic wildlife habitat. To the extent that water needs cannot be met through aggressive conservation efforts, water development projects should be selected and located in a way that minimizes those negative impacts. In particular, projects recommended for development should:

- avoid harm to threatened or endangered species
- avoid impacts to wetland areas, particularly forested wetlands
- avoid stream segments worthy of designation as ecologically significant
- not worsen water quality in impaired watersheds.

Endangered species. No project should be considered if it would have significant adverse effects on species that are listed (or being considered for listing) as threatened or endangered under state or federal law. Because those species already face an uncertain future, no project should be recommended that would increase that uncertainty.

Wetlands. Wetlands perform many critical functions, including filtration and removal of pollutants, flood attenuation, groundwater recharge, and provision of fish and wildlife

habitat. Forested wetlands, particularly bottomland hardwood forests, are critical wildlife habitats that have declined by an estimated 63 percent in Texas. Projects that would result in significant loss of these virtually irreplaceable habitats should be avoided. Losses can occur in two ways: wetlands can be flooded or cleared during reservoir construction, or they can be destroyed indirectly through alteration of flow regimes. Just as periodic "out-of-bank" flows are needed to sustain bays and estuaries, wetlands located along rivers require periodic inundation to maintain their unique characteristics. Accordingly, proposed projects should be evaluated to ensure that significant wetlands are not lost through diminished "out-of-bank" flows.

Segments of unique ecological value. S.B. 1 allows regional planning groups to nominate stream segments for the designation of "segments of unique ecological value." The Texas Parks and Wildlife Department has provided each region with a partial list of streams potentially qualifying for such a designation. The National Wildlife Federation believes good regional plans should include proposals for designation. We recognize, however, that many regional groups are uncertain about the legal ramifications of such designations. Pending clarification of these legal questions, regional plans should, at a minimum, avoid recommending projects that would adversely impact a segment identified as potentially qualifying for designation.

Water quality. Impoundments and diversions of water have the potential to concentrate pollutants and degrade water quality in rivers, streams, and coastal waters. Proposed water development projects should avoid degrading water quality, particularly in segments already listed as impaired under state and federal law. Regional water plans should provide information about impaired waters within the region and should address the potential impact of any proposed project on those waters.

4. Sustainable Yield

Water planning must be based on a basic premise of ensuring that water needs will be addressed on a sustainable basis.

A sustained-yield approach is the key to sound water management. In Texas, surface water regulations limit withdrawals to the amount expected to be available for the foreseeable future. Although environmental flows often have been ignored, this basic structure reflects a sustainable-yield approach to water management. Unfortunately, Texas has not taken that approach with respect to groundwater management. Recharge rates for groundwater vary tremendously, and in many areas of the state, groundwater is being pumped at rates that greatly exceed the rate of recharge. In addition to its inherent value as a water supply for current and future generations, groundwater often directly affects surface water availability. Groundwater may supply the baseflow of streams through discrete spring flows or by seepage along riverbanks or in river beds. When groundwater levels are reduced, surface water may flow or seep into the groundwater formation, dramatically reducing stream flows. Thus, in many instances, it is not possible to have certainty in surface water supplies without ensuring that groundwater supplies are sustained.

For these reasons, groundwater must be managed on the basis of sustainable yield. This means that, subject to some short-term fluctuations to account for drought periods, withdrawals should not exceed recharge. In some instances, in order to avoid major economic disruptions, the movement to a sustainable-yield approach to groundwater use may have to occur over an extended time period. But long-term water planning must reflect a commitment to sustainable yield to prevent depletion of groundwater supplies. We should not manage our groundwater in a way that deprives future generations of the benefit of an invaluable natural resource that we inherited.