

B. Water for Wildlife and Environmental Purposes

Background

As competition for the state's limited water intensifies, concern is growing that water supplies for wildlife and environmental purposes, or the minimum instream flow to conserve such resources, have not been fully considered in policy making and planning frameworks. Thus, maintaining minimum instream flows has become an important water use management issue in Nevada.

Instream flow is typically defined as water which is not diverted from a channel and used consumptively, but rather remains in a water course to maintain other non-consumptive beneficial uses. Herein, the term *instream flow* encompasses the broad range of non-consumptive uses also identified as water for wildlife and environmental purposes and resource conservation. A common water planning criteria is *minimum* instream flow. This is defined as the smallest amount of flow (measured in cubic feet per second) necessary to maintain one or more beneficial uses specified for a stream or segment. The term *instream flow* is further described in the broad context of water supply planning to conserve and enhance streams, riparian zones, wetlands, springs and lake and the biological resources they support.

Instream beneficial uses in Nevada include habitat for aquatic invertebrates, fishes, birds and other wildlife, maintenance of water quality, and recreation. Maintaining the productivity, diversity, and resiliency of Nevada's biological resources depends on adequate and reliable stream flow. Minimum streamflow for natural resource conservation is the focus of this issue paper. For more information about water supply planning for recreation, see the issue paper titled *Maintenance of Recreation Values* in Part 3 of the *Nevada State Water Plan*.

Surface water in Nevada is often fully appropriated. Yet, relatively few water rights are held for resource conservation, since most appropriated water is permitted for consumptive beneficial uses that require offstream diversions.¹ Since early in the state's development, people have had to divert streamflow for such essential purposes as agriculture, mining, domestic, municipal and industrial supply uses. While acknowledging the necessity of continuing to divert water for human use, society has begun to place increasing value on environmental protection and natural resource conservation.

¹ Agricultural, municipal and industrial consumptive uses generate return flows which vary in quantity and quality. Return flow is the portion of water diverted for use that is not consumed and is returned to the source. Unconsumed water which is returned to the original source is available for the next offstream or instream use. Streamflow which is reused many times without intervening treatment can increase pollutant concentrations, negatively affecting biological productivity of crop and pasture lands as well as aquatic and riparian ecosystems. Ameliorating impacts such as elevated salinity, biochemical oxygen demand, and temperature often requires the application of more water to flush or dilute pollutants concentrated in the soil or water column.

One hundred years ago, impacts on fish populations, riparian vegetation and lake ecosystems as a result of diversions were unanticipated or not viewed as a concern. In the last 25 years, expectations for the protection of rivers and streams have changed gradually. The Clean Water Act (CWA), Endangered Species Act (ESA), National Environmental Policy Act (NEPA) and Wild and Scenic Rivers Act (WSRA) were all passed in the last 30 years in growing recognition of the economic and social benefits to conserving natural resources. These laws are persuasive testimony to continuing public concern for the environment. Water resource allocation and management decisions now include consideration of vulnerable species, water quality, environmental values and recreation demand generated by the state's growing urban population and tourism-oriented industry. Nevada's laws permitting instream flow rights for wildlife and environmental (and recreation) purposes are responsive to this perspective.

Nevada's Unique Water Resources

Nevada's landscape encompasses unique water dependent ecosystems that provide economically and socially important benefits, including fishing, hunting, wildlife watching, scientific research and solitude. The state has terminal desert lakes and expansive wetlands which are crucial to waterfowl migrations. Rare, relict fish and mollusk species still subsist in ancient springs. Native fish populations have stood the test of the Great Basin's climatic and hydrologic extremes. Riparian plant communities host diverse assemblages of mammals, amphibians and birds, and also moderate stream temperatures, trap sediment, and impart resiliency and predictability to channel behavior in times of flood. Water available to these resources must be adequate in frequency, duration and amount in order to maintain their natural restorative and regenerative functions. Critical self regulating mechanisms include the ability to convert, dilute and flush accumulated pollutants; redistribute sediment to retain floodway capacity; rejuvenate coarse and fine grained patches of habitat essential for the diverse life cycle needs of aquatic organisms; disperse seeds from riparian and wetland plants and thereafter keep soil moist for their germination and survival.

The number of native fishes that have become extinct or listed as threatened, endangered or sensitive by federal and state agencies is an indicator of the adequacy of water supplies available for aquatic ecosystems. Of Nevada's 104 native fish species and subspecies, 11 are now extinct (i.e., no longer existing) or extirpated (i.e., no longer existing in portions of its native range) and 23 are listed as threatened or endangered under the Endangered Species Act (ESA). Approximately 56 percent are designated as sensitive.² Other water dependent species at risk include 7 amphibians, 3 mammals, 67 gastropods which inhabit springs and/or creeks, and a number of water insects. Twenty-eight (28) bird species that depend upon functioning aquatic or riparian ecosystems at some point in their life cycle are also at risk.³ The statewide distribution of mapped occurrences of sensitive species is shown on Figure 3-1 on page 3B-5. The sensitive status of so many species is an indicator of the need for instream flow assessment and protection in some areas.

² *Sensitive* is a term used by the Nevada Natural Heritage Program that is applied to species that are tracked. Such species are either declining, exists in isolated populations, or requires special management to survive. Of the 70 native, extant fishes that are not listed, 39 are designated as sensitive.

³ Personal communication, Nevada Natural Heritage Program staff, December 1998.

Other indicators that water supplies may be insufficient for wildlife and environmental purposes include extensive loss of riparian forest and wetland systems; long term declining water levels in Pyramid Lake and Walker Lake; periodic drying of river channel segments; and impaired water quality of some lakes and segments of the state's major rivers.⁴ Managing stream flow to protect sensitive species alleviates stresses from other detrimental forces, forestalling more stringent regulations, and thereby reducing administrative burdens on private enterprise and public agencies. Thus, water resource managers are increasing their efforts to augment water supplies for instream beneficial uses and to enhance the integrity of water dependent ecosystems.

Factors other than stream flow depletion by offstream diversions may have an impact upon aquatic and riparian life and habitats. For example, some dams prevent fish passage or alter sedimentation processes in ways that impair the quality of aquatic habitat for fish and wildlife propagation. Nonnative fish species prey on a range of aquatic organisms and may be more aggressive, out-competing native fishes for spawning habitat and food supply. Overdrafting shallow aquifers may affect stream and spring flow, a growing concern as more ground water supplies are developed. Flow regimes may be impacted by land use activities and developments that do not adequately mitigate their effects on hydrologic processes, thereby diminishing a watershed's ability to capture and slowly release runoff and recharge aquifers. Encroaching development, nonpoint source pollution, invasion of exotic plants, degraded watershed and channel conditions, and natural variation are other possible causes for aquatic ecosystem impacts. These site specific factors should be evaluated when determining how best to achieve aquatic and riparian resource conservation objectives.

Assessing Water Needs for Wildlife and Environmental Purposes

Determining minimum instream flow requirements is an important consideration in protecting Nevada's comparatively rare aquatic and riparian ecosystems (and associated recreation opportunities). Minimum instream flow requirements fluctuate seasonally and vary by stream segment depending on characteristics such as channel dimensions and shape, amounts of shallow ground water flowing into or out of a channel reach, water or moisture requirements of present (and absent) aquatic and riparian animal and plant species, and the rate of pollutant inputs from both natural and human sources compared to the natural capacity of biogeochemical processes (e.g., nutrient and carbon cycles) to regulate pollution levels.

In Nevada, most upper basin stream segments are free-flowing. Proceeding downstream through the middle and lower valleys of Nevada's river basins, stream flow increasingly becomes regulated

⁴ The estimated long term loss of wetland acreage statewide is 52 percent. In western Nevada, wetland losses are about 85%. An evaluation of threats to wetlands by the Nevada Divisions of Wildlife and State Parks in 1987 ranked diversions and lack of water rights as the most serious threat. (in *Wetland Conservation Plan Applicable to Nine State of Nevada Wildlife Management Areas*, Huffman and Associates, Inc., July 1998.) Lower Truckee River riparian shrub and forest communities historically covered about 7,700 acres, and is estimated today to be 1,020 acres according to recent US Army Corps of Engineers reports. US Fish and Wildlife Service vegetation mapping in 1993 indicated only about 85 acres of cottonwood forest coverage remains below Derby Dam (in *Truckee River Operating Agreement, Draft EIS/EIR, Biological Resources Appendix*. US Department of the Interior. February 1998.)

by the operation of reservoir and diversion dams. Flow fluctuations are important to help (re)establish riparian vegetation, maintain water quality, remove sediment from the floodway, and otherwise maintain the efficiency of a stream channel. Diversions may have a dampening effect on flows, moderating the natural highs and lows. The combination of natural losses and offstream diversions significantly reduces streamflow through the summer and autumn months. Typically, October low flow measurements are in the range of 1.0% to 0.1%, or less, of June peak flow measurements in the middle and lower stream reaches. Natural losses are due to higher evaporation and transpiration rates and seepage away from the channel. Evaporation and transpiration losses may be exacerbated along over-widened and unshaded stream segments, or where exotic phreatophytes (e.g., tamarisk) are dominant. By late autumn and early winter, stream discharge rates typically rebound to approximate base flow levels.

There are no standards for setting a baseline or formula for establishing minimum instream flows. However, various methods to assess minimum flow or minimum pool requirements for biota, recreation, aesthetics, and channel maintenance have been developed. Equivalent methods to estimate minimum water supply needs for other water bodies and wetlands have been developed and have been used occasionally in Nevada. Most often, instream flow assessments in Nevada have been conducted in response to applications for new water rights or changes in the point of diversion for existing water rights, and projects that require environmental assessments in accordance with provisions of the NEPA or the ESA.

Water Rights for Wildlife and Environmental Purposes

Protecting instream flow will depend on acquiring water rights, and converting them from existing uses to instream uses according to state water law. Nevada's legislature adopted a system of allocating water rights based on the principles of prior appropriation and beneficial use in 1905. Because surface water demand sometimes exceeded normal streamflow, the courts had to settle, or adjudicate, competing water claims on large and small stream systems. Court decrees were formulated for each major river, specifying the water right holder, the extent of the water right (i.e., quantity, location, and manner of use), allocation priorities, and river system-specific procedures for water transfers.

In recent years, more consideration has been given to obtaining water rights for instream purposes because of advancements in science and changes to the state water law. As scientists have refined their knowledge of aquatic and riparian ecology and as agencies have increased resource monitoring, awareness has grown regarding the impacts of diminished streamflow and lowered ground water levels. During this period, the Supreme Court of Nevada handed down decisions that have led to a broader legal interpretation of beneficial use, and have better defined public interest criteria that has been applied by the State Engineer when making decisions about appropriative water rights.

In 1988 the Court ruled that the State Engineer acted within the legislated authority of the office in granting a water right to the U.S. Bureau of Land Management (BLM) to maintain a minimum pool of water, an *in situ* use (i.e., in place, non-diversionary and nonconsumptive), for recreation, wildlife, fisheries and stockwater purposes in Upper Blue Lake, Humboldt County (Nevada v. Morros, 766 P.2d 263 (Nev. 1988)). Nevada water law allows the holding of water rights for instream uses for the benefit of biological resources and recreation. Additionally, where instream water rights for environmental uses have been permitted, applications for new water rights or the transfer of existing water rights may be denied if the proposed use “threatens to prove detrimental” to the instream water rights.

Examples of Instream Flow Management Actions

Over the past ten years a number of agencies and conservation organizations have assessed water supply needs and pursued water right purchases for wildlife and environmental purposes. Some of these activities are briefly described below.

1. To satisfy Truckee-Carson-Pyramid Lake Water Rights Settlement Act (Public Law 101-618) provisions, wetland water requirements were estimated by the US Fish and Wildlife Service (FWS) for the Stillwater National Wildlife Refuge, Stillwater Wildlife Management Area, Carson Lake and Pasture and Fallon Paiute-Shoshone Indian Reservation wetlands. The FWS, in cooperation with the U.S. Department of Interior (DOI) and Nevada Division of State Lands (NDSL), is responsible for purchasing from willing sellers sufficient water to sustain 25,000 acres of prime wetlands in Lahontan Valley.
2. To implement the Truckee River Water Quality Agreement, cooperating agencies have modeled water quality improvement as a function of stream flow and used the information to estimate water supply needs for flow augmentation during periods of lower water quality. Washoe County and the cities of Reno and Sparks, have begun to purchase water rights and apply for their transfer.
3. Also on the Truckee River, the FWS, using a plan developed by The Nature Conservancy, has obtained the Federal Water Master’s agreement to modify reservoir releases when surplus water is available to meet requirements for riparian forest regeneration along the lower river.
4. The BLM has estimated Walker Lake inflow requirements for the restoration of lake level and water quality in support of the vulnerable cutthroat trout population and migratory waterfowl habitat.
5. The Nevada Division of Wildlife (NDOW) has assessed minimum instream flows to determine the potential impact to fish habitat from water development projects proposed for the Truckee River and Lamoille Creek. The agency also has taken advantage of opportunities to obtain water rights and formal and informal agreements for return flow water from irrigation systems, a power plant, and a municipal water treatment plant to maintain reservoir pool elevations and wetlands on state wildlife management areas (WMA).

Since a water right is recognized as property, any public policy measures to increase water supplies for resource conservation purposes may require compensation. In Nevada, both federal and state funds have been allocated to purchase water rights from willing sellers. Alternative approaches are being implemented in other western states. Colorado allows tax benefits for water right donations to the Colorado Water Conservation Board. In New Mexico, the Middle Rio Grande Conservancy District recently opened a water bank, which will lease surplus water to other users.⁵

Conservation organizations in several states have acquired water rights for instream flow protection. They have identified important considerations when evaluating the benefits of acquiring water rights for instream flow enhancement, which include: (1) whether transfer of the water rights to instream use can meet transfer requirements of state law; (2) the seniority of the water right relative to others; (3) the suitability of the source water for the instream purpose(s); (4) the availability of reservoir storage rights, if required; and (5) the price for a water right, which varies in a competitive market according to such factors as location, type of use and priority date.

State Agency Involvement in Instream Flow Management

Divisions within the Department of Conservation and Natural Resources have primary authority to administer laws and regulations pertaining to water use and allocation, water quality, and fish and wildlife populations in Nevada. Thus, these agencies have the largest role in water supply management for resource conservation. Federal agencies with land use management and federal law administration responsibilities make important contributions to instream flow protection as well. Local and tribal agencies have also become involved with instream flow management.

Nevada Division of Wildlife

The Nevada Board of Wildlife Commissioners has adopted explicit policies and regulations to achieve adequate instream flows, minimum reservoir pools, and water for wetlands, springs and seeps for the benefit of fish, aquatic ecosystems and wildlife. NDOW supports the acquisition of water rights from willing sellers as opportunities arise. Nine state wildlife management areas (WMAs) managed by NDOW contain wetland acreage and reservoirs for which surface and ground water rights have been obtained. Water rights at some WMAs depend on surplus flow or irrigation tail water, presenting management constraints and resource quality concerns, especially during dry periods.⁶

NDOW also has responsibilities and programs for protection and propagation of native fish populations and sensitive species. NDOW reviews water appropriation applications submitted to the State Engineer to evaluate potential for impacts to wildlife and habitat. If the proposed water use would threaten, drastically modify, or severely curtail protected or sensitive wildlife populations or their habitats, the Division Administrator may file a written protest against granting the

⁵ *Saving Our Streams Through Water Markets. A Practical Guide.* Clay J. Landry. Political Economy Research Center. 1998.

⁶ *Wildlife Resource Values of Wetlands. Task II. Wildlife Resource Values of Wetlands at the State of Nevada Wildlife Management Areas.* Huffman and Associates, Inc. July 1998.

application. Assessments of the adequacy of minimum instream flow have been performed to provide the grounds for protest. Instream flow and aquatic ecosystem values have been successfully protected through protest filings against water right transfers on the Truckee River west of Reno and Lamoille Creek near Elko.

NDOW has the ability to partially compensate for impacts of water supply deficiencies on fish and wildlife. For example, in coordination with federal agencies, NDOW has programs to rear game and sensitive fish species (e.g., Lahontan cutthroat trout, razorback sucker) at hatcheries and reservoirs for stocking programs associated with recreational fishing and sensitive species recovery plans. However, game fishes are not stocked in some areas to avoid potential impacts on populations of sensitive native aquatic species.

Periodically NDOW performs stream surveys on major rivers and tributaries to evaluate habitat conditions for wildlife and fishes, and fishery management plans are prepared for major rivers, reservoirs and lakes. This activity presents opportunities to assess instream flow requirements.

Nevada Natural Heritage Program

The Nevada Natural Heritage Program (NNHP) collects and disseminates information on the occurrence, distribution, and population status of all threatened, endangered and sensitive flora and fauna in order to identify trends that could result in their becoming either more or less vulnerable. Areas of the state which sustain critical concentrations of sensitive species are identified and ranked relative to protection urgency and management needs. This information is published periodically, most recently in the report titled *Scorecard - June 1998: Highest Priority Conservation Sites*. NNHP staff cooperate with other agencies, conservation organizations and developers to create habitat conservation plans and recovery plans for at-risk species. Each year the Program answers hundreds of requests for location, biology and conservation information and technical advice from planners, developers, agencies, scientists, conservationists and the general public.

Approximately 43 percent of Nevada's native fishes are designated sensitive. In addition, a number of sensitive amphibians, gastropods, insects, mammals, birds and plants have been identified. Ongoing research into the ecology of springs continues to unveil rare and unique aquatic species. Progress in mapping the past and current distribution of waterfowl, shorebirds and water resource-affiliated passerine birds (i.e., perching birds and songbirds) indicates that the loss of aquatic and wetland habitat is associated with a reduction in the abundance of bird species. Distributing information on the status of the vulnerability of species and cooperating in conservation planning is a crucial aspect of proactive management. By so doing, potential or actual impacts of land use activities on sensitive species may be moderated sufficiently to preclude the need for listing the species under the Endangered Species Act.

Nevada Division of Water Resources

Nevada water law (NRS Chapters 533, 534) and Court decisions authorize the State Engineer to approve water right applications for various instream beneficial uses, which may include wildlife, establishment of wetlands and fisheries, and recreation. Approval for a new water right or transfer of an existing water right is contingent upon the State Engineer's determination that certain criteria can be satisfied. The review criteria are: 1) the requested water is available, 2) the use will not conflict with existing water rights, and 3) the use does not threaten to prove detrimental to the public interest. Public interest is a discretionary matter for the State Engineer. Instream flow is not an explicit public interest criteria against which an application to appropriate water must be considered, however protection exists within the law. Where instream water rights for resource conservation purposes have been permitted, the State Engineer must evaluate whether a proposed new use or change in use threatens to prove detrimental to the instream water right. Further, spring flows which support wildlife populations must be protected (NRS 533.367).

New water rights and transfers of existing water rights have been granted for resource conservation and recreation purposes at a number of sites. In addition to those examples mentioned previously, other sites are Meadow Valley Wash (Condor Canyon), Upper Blue Lake (Pine Forest Range, Humboldt County), Mahogany Creek (Humboldt County), Bruneau River, Franklin Lake and South Fork of the Humboldt River.

Nevada Division of State Lands

The Nevada Division of State Lands (NDSL) acquires land and water rights on behalf of other state agencies, such as NDOW. The voters elected in 1990 to fund land and water rights acquisitions for parks and wildlife through a state bond. The Park and Wildlife Bond Act of 1990 (Question 5) authorized the expenditure of \$47.2 million which has been used to purchase land with special resource values, including three ranches along the lower Carson River connecting Fort Churchill State Historic Park with Lahontan State Recreation Area. In addition, \$5 million was designated for water rights, enabling NDSL so far to purchase about 8,000 acre feet of water for the Lahontan Valley Wetlands. Efforts to purchase additional land and water rights continue as a portion of the bond fund remains available.

As owner of the beds and banks of navigable water ways (i.e., Truckee, Carson, Colorado and Virgin rivers, Lake Tahoe and Washoe and Walker lakes), NDSL has authority to issue permits for activities and structures below the ordinary high water line, including construction of diversion dams. Through coordination with other agencies, permits may be conditioned to mitigate instream flow concerns, such as fish passage, habitat restoration and channel protection.

Nevada Division of Environmental Protection

The State Environmental Commission (SEC) is responsible for adopting surface water quality standards to protect beneficial uses. While abnormally high or low instream flow can adversely affect water quality and the attainment of a beneficial use, the Division of Environmental Protection (NDEP) and SEC have no authority under the Nevada Revised Statutes (NRS) to regulate water quantity (NRS 445A.725). Accordingly, water pollution control regulations do not consider water

quality standards violated during periods of abnormal flow (NAC 445A.121.8). However, a recent U.S. Supreme Court ruling has granted limited instream flow authority under section 401 of the Clean Water Act. Although NDEP has been delegated 401 certification authority, the agency clearly is bound by state statute. As stated previously, the Divisions of Water Resources, Wildlife and State Lands address instream flow with a variety of management techniques.

Federal Agency Involvement with Instream Flow Management

Since Nevada has primacy for administration of water laws, federal agencies must submit an application to the NDWR and receive the State Engineer’s approval for the appropriation or transfer of a water right for instream wildlife and environmental use. Federal agencies may seek to acquire instream flow water rights in order to carry out provisions of the Endangered Species Act, Clean Water Act, Migratory Bird Treaty Act, or the Wild and Scenic Rivers Act. As mentioned before, the BLM, FWS, and DOI have been involved in purchases and transfers of water rights in several states under the auspices of these federal laws. Special designations under the Wild and Scenic Rivers Act have not been authorized by Congress in Nevada.⁷

The U.S. National Park Service (NPS) and U.S. Fish and Wildlife Service (FWS) have the ability, in limited circumstances, to protect instream flows through assertion of federal reserved water rights and implementation of federal environmental laws. Federal reserved water rights are implied rights, based on the primary purposes for which the federal land was reserved by Congress, and limited to the minimum quantity of water needed to accomplish the purposes for which the reservation was created. The priority date of reserved water rights coincides with the date Congress authorized creation of the reservation. Indian tribes and federal agencies have asserted reserved water rights for instream flows and minimum pools within Indian reservations, national parks and monuments, and wilderness areas. The U.S. Supreme Court decision requiring reduction in permitted agricultural ground water pumping to maintain the Devils Hole spring pool (an enclave of Death Valley National Monument) for the benefit of an endangered species of pupfish is one instance in Nevada where federal reserved water rights have been claimed successfully for minimum pool protection.

Federal courts in one case have decided that under some circumstances water should be reserved to meet resource protection requirements of federal laws. The U.S. Supreme Court ruled in favor of a proposal to release water from Stampede Reservoir for fish habitat flows for the threatened Lahontan cutthroat trout and endangered cui-ui inhabiting waters within the Pyramid Lake Paiute Indian Reservation and lower Truckee River.

The U.S. Bureau of Land Management (BLM) in Nevada is working on specific programs that may have the effect of preventing future riparian wildlife habitat loss and benefitting instream flow on rivers in western Nevada. One is the Rural Lands Initiative, in which a land owner can voluntarily

⁷ In California, segments of the East Fork of the Carson River, and West Walker, each have been designated a “California Wild and Scenic River.” The segments terminate at the state border. Similar to the federal counterpart, the California Wild and Scenic Rivers Act requires that certain rivers possessing extraordinary scenic, recreational, fishery, or wildlife values be preserved in their free-flowing state.

sell an agricultural conservation easement to the BLM. The conservation easement is legal assurance that use of productive agricultural land will continue to be cultivated, thereby avoiding the loss of wildlife, riparian, ground water or surface water resource values that often comes with subdivision and development. This program does not involve a water right acquisition. Another BLM program is “Water for Walker Lake”. Its purpose is to acquire water rights from willing sellers and transfer the water use downstream to Walker Lake. Water is needed to raise lake levels sufficiently to improve the aquatic and riparian ecosystems for the diminished Lahontan cutthroat trout population and migratory bird habitat.

The BLM and U.S. Forest Service issue permits for grazing, timber harvest, mining and water development on federal lands. These permits may be conditioned to mitigate hydrologic impacts, such as diminished stream flow or reduced shallow ground water recharge. Riparian zone restoration is an important management objective in many areas. Watershed conditions are assessed periodically where permitted land use activities occur. If conditions warrant, measures to improve vegetative cover, soil and stream channel stability, and riparian and wetland plant community structure may be implemented by the permittee or the agency. Such rehabilitative efforts can augment instream flow by enhancing the ability of watersheds to detain snowmelt and storm runoff.

Local Agency and Tribal Involvement with Instream Flow Management

Local agencies have had some involvement with minimum instream flow protection and applying for water rights for resource conservation uses. Actions taken by Washoe County and the cities of Reno and Sparks and the Pyramid Lake Paiute Tribe provide examples of local governments directly assessing minimum instream flow requirements and obtaining water rights to meet water resource objectives. In accordance with the Truckee River Water Quality Agreement, the county, cities, and the DOI, will acquire reservoir storage and water rights for the purpose of improving water quality in the lower Truckee River. A total of \$24 million will be spent jointly.

The Pyramid Lake Paiute Tribe obtained federal court consent to be granted water and storage rights on the Truckee River system for the protection of the Lahontan cutthroat trout and the cui-ui. Water stored in Stampede Reservoir is used solely for the benefit of the Pyramid Lake fishery.

Issues

1. A large share of Nevada’s biological diversity is found in association with the state’s comparatively rare aquatic and riparian ecosystems. An evaluation of threats to wetlands by the Nevada Divisions of Wildlife and State Parks in 1987 ranked diversions and lack of water rights as the most serious threat. A large number of fishes and other fauna dependent on aquatic and wetland ecosystems are designated sensitive, threatened, or endangered. A large percentage of the threatened, endangered and sensitive fish species and other aquatic organisms inhabit desert spring pools. Over 50 percent of the wetlands statewide, and over 80 percent of those in western Nevada, have been lost. Approximately 87 percent of the riparian area along the Truckee River and 50 percent of the wetlands along segments of the Humboldt River and Rock Creek also have

been lost.⁸ The loss in riparian area along other large streams has not been quantified. Difficulty in stabilizing and reversing statewide trends in aquatic and riparian wetland resource losses signals a need for more conservation efforts.

2. The historic and potential future losses of the state’s aquatic, riparian and wetland ecosystems, and the large number of water dependent species at risk indicates that additional emphasis on proactive planning and management of water supplies for natural resource conservation is a matter of urgency for the state. Although divisions in the Department have individual roles in protecting water supplies for natural resources, a more definitive, comprehensive and integrated state policy and appropriate authority may be needed to improve the effectiveness and efficiency of conservation actions. Current, key policy mechanisms include: a) the legal authority of the State Engineer to permit the appropriation of instream (non-diversionary) water rights for fish, wildlife and recreation in accordance with state statutes and Court decisions; b) the state funded water rights acquisition program for wetlands; and c) policies adopted by the Nevada Wildlife Commission that encourage NDOW to acquire water for wildlife and their habitats and to protest surface and ground water right applications that would threaten, drastically modify or severely curtail wildlife and its habitat.⁹
3. The Nevada Board of Wildlife Commissioners has adopted policies that directs the Division of Wildlife to secure water from willing sellers in order to maintain adequate instream flows, minimum reservoir pools, and existing wetlands, springs and seeps for the preservation, maintenance and enhancement of wildlife and their habitats. However, difficulties in acquiring water rights may be encountered because levels of funding or staffing are insufficient. In some instances, other participants in a water market can move more quickly to purchase water rights. Thus, the agency is hampered in its ability to purchase or lease more suitable or senior water rights. Increased cooperation with land and water conservancies is a strategy that could be implemented to overcome some of the mentioned obstacles to water rights procurement.
4. Obtaining instream flow rights may prove to be a cost effective and durable approach to achieve multiple aquatic and biological resource conservation objectives, including sensitive species protection, water quality requirements and increased recreation opportunities. There is a need for incentives to increase water supplies for resource conservation purposes may raise private and public support for this activity. Measures which could enhance instream flows include water conservation, noxious phreatophyte control, or watershed improvements. To encourage such actions, an administrative mechanism may be needed to officially permit, verify and establish a “credit” for the amount of “new” or “additional” water made available for instream flows. For example, an individual might have an interest in paying for the implementation of conservation measures to augment streamflow for fish habitat if there was certainty that a valued, transferrable credit would be created. This approach could encourage natural resource improvements which may exceed the benefits of simply increasing water supplies. For more information about credit for conservation, see the *Conservation* issue paper (Part 3, Section 1A

⁸ Wildlife and Wildlife Habitats Associated with the Humboldt River and Its Tributaries. Biological Bulletin No. 10. Nevada Department of Wildlife. 1989.

⁹ Nevada Wildlife Commission Policies, Numbers 60 and 61, as amended December 2, 1995.

of the Nevada State Water Plan).

5. Most current surface water withdrawals are for agricultural purposes. Thus, acquiring additional water supplies for instream flow would likely involve the agricultural industry and rural communities. Agriculture is important to the economy and culture of many counties. Acquisition of water rights for instream flow protection could impact the viability of farming and ranching beyond the property lines of individual parcels. The continuity of the channel network and distribution of operation and maintenance costs within irrigation districts are some potential effects that may have to be addressed. Some irrigated crop fields and pastures support wildlife, which is another important consideration. A public program with market incentives and technical assistance may be needed to facilitate the willing agricultural water user to manage water more conservatively, lease water rights for instream uses, or undertake other measures to augment water supplies for water quality improvement, fisheries protection and other objectives.
6. Management of species that are threatened or endangered has proven to be complex, controversial, and costly for private enterprise and resource managers. Nevada is among the top 5 states in the nation for both the diversity and vulnerability of its biological resources. A large percentage of vulnerable species rely on functioning aquatic and riparian ecosystems for survival. Proactive planning and actions now could improve the distribution of species, and thus avoid the imposition of federal mandates and implementation of more difficult and more expensive recovery strategies later.
7. Use of the *minimum* criterion as a water supply planning objective may narrow the focus of conservation efforts to the water resource conditions needed for a particular resource or attribute (i.e., habitat for a fish species, or a recreation activity). Another criterion used in some instream flow management assessments is the *optimum* water supply, which expands the focus of study to the integrity of an ecosystem. Determining the optimum quantity of water needed entails conducting a more comprehensive and integrated assessment, but may increase the likelihood that the resource will become self-regulating, thereby reducing future management needs.

Recommendations

To enhance the ongoing efforts of the state to enhance water supplies for resource conservation purposes and to encourage and facilitate public support, the following recommendations are offered.

1. The Department should seek legislative support for:
 - development of a comprehensive and integrated management plan for the purpose of prioritizing and coordinating interagency and interdisciplinary assessments of critical water needs for wildlife and environmental purposes;
 - adoption of a policy that actively encourages the purchase, lease or donation of existing water and storage rights for transfer to instream rights or to maintain lake or wetland areas;
 - establishment of a Water Rights Trust Fund to fund acquisition efforts; and
 - incentive programs for the restoration of impaired aquatic and riparian resources (e.g.,

“conservation for credits,” see recommendations in the Conservation issue paper, Part 3, Section 1A).

2. The Department should convene a statewide working group of experts to identify alternative mechanisms for obtaining water supplies for resource conservation and examine the existing legal, institutional, and economic aspects of identified alternatives. In addition, the working group should develop guidelines and criteria to be used by the Department in planning and evaluating water resource projects, including dam construction, significant water transfers, and modifications to reservoir storage and operation plans.

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