December 17, 1976

TO GOVERNOR EDMUND G. BROWN JR., AND
MEMBERS OF THE CALIFORNIA LEGISLATURE

We are pleased to submit, pursuant to the Nejedly-Bagley-Z'berg Suisun Marsh Preservation Act of 1974 (SB 1981), a Suisun Marsh Protection Plan.

Bordering the northern Bay, just west of the Delta, "the Marsh represents a unique and irreplaceable resource to the people of the state and nation;" and as ". . . the future of the wildlife values of the area is threatened by potential residential, commercial and industrial developments . . ." (SB 1981). The Marsh comprises about 10 percent of California's remaining wetlands. Thus, it plays an important role for water fowl of the Pacific Flyway and provides critical habitat for other wildlife species.

In brief, the Plan proposes (1) a primary management area encompassing the 89,000 acres of tidal marsh, managed wetlands, adjacent grasslands, and waterways over most of which BCDC now has jurisdiction, and (2) a secondary management area of approximately 22,500 acres of significant buffer lands. Under specific guidelines in each area, Solano County would be responsible for preparing and administering a local protection program. BCDC would represent the state's interest, serving as the land use permitting agency for major projects in the primary management area, and as an appellate body with limited functions in the secondary management area.

The Plan also recommends that the state consider purchase of approximately 1,800 acres of marsh; that water quality in the Marsh be maintained; and that land tax assessing practices reflect the conditions of the Plan.

The Plan development process included 17 public hearings, two by the Department of Fish and Game on the fish and wildlife element. The others were held by BCDC on additional elements and on the draft Plan. BCDC recommended this final Plan after two further Commission meetings.

Although not every viewpoint offered was accepted, all were carefully considered and many do now appear in the Protection Plan. The Commission is most appreciative of the beneficial participation of public jurisdictions and agencies, private organizations and individuals, and of the capable and dedicated work of BCDC's staff.

Respectfully,

JOSEPH C. HOUGHTELING
Chairman

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PART I

INTRODUCTION

The Suisun Marsh comprises approximately 85,000 acres of tidal marsh, managed wetlands, and waterways in southern Solano County. It is the largest remaining wetland around San Francisco Bay and includes more than ten percent of California's remaining wetland area. The Marsh is also a wildlife habitat of nationwide importance. It plays an important role in providing wintering habitat for waterfowl of the Pacific Flyway and, because of its size and estuarine location, supports a diversity of plant communities. These provide habitats for a variety of fish and wildlife, including several rare and endangered species.

Recognizing the threats to the Suisun Marsh from potential residential, commercial, and industrial developments, and the need to preserve this unique wildlife resource for future generations, the California Legislature passed and the Governor signed in September, 1974, the Nejedly-Bagley-Z'berg Suisun Marsh Preservation Act of 1974. The Act directs the San Francisco Bay Conservation and Development Commission and the Department of Fish and Game to prepare the *Suisun Marsh Protection Plan* "to preserve the integrity and assure continued wildlife use" of the Suisun Marsh.

The California Department of Fish and Game prepared a Fish and Wildlife Element to be used by the San Francisco Bay Conservation and Development Commission in the preparation of the *Suisun Marsh Protection Plan*. The Fish and Wildlife Element includes an inventory of the ecological characteristics of the Marsh and its surroundings, and a recommended natural resource protection plan. Information and recommendations provided by this element have been incorporated into the Suisun Marsh Protection Plan.

The planning program conducted by the San Francisco Bay Conservation and Development Commission involved the preparation and tentative adoption of a series of nine background planning reports: Suisun Marsh Environment; Suisun Marsh Aquatic and Wildlife Resources; Water Supply and Quality in the Suisun Marsh; Natural Gas Resources of the Suisun Marsh; Recreation and Access in the Suisun Marsh; Utilities, Facilities and Transportation in and Around the Suisun Marsh; Water-Related Industry Adjacent to the Suisun Marsh; Suisun Marsh and Upland Resource Management; and Developing an Implementation Program for the *Suisun Marsh Protection Plan*. These reports provided the

information needed to prepare the findings and policies of the final *Suisun Marsh Protection Plan*, as well as allowing extensive opportunities for public involvement through hearings before the Commission. The Fish and Wildlife Element and the background planning reports are the basis for the Plan and will be submitted to the Governor and Legislature as a supplement.

The objectives of the Protection Plan are to preserve and enhance the quality and diversity of the Suisun Marsh aquatic and wildlife habitats and to assure retention of upland areas adjacent to the Marsh in uses compatible with its protection.

The Protection Plan consists of four sections. Part I, the Introduction, describes the planning program and Plan objectives. Part II provides the Plan's Findings and Policies. Part III describes the program for carrying out the Plan, and Part IV consists of the Protection Plan Map and a map illustrating the Marsh natural factors.

PART II

FINDINGS AND POLICIES

ENVIRONMENT

The aquatic and terrestrial habitats of the Suisun Marsh and adjacent uplands support many species of fish and wildlife, primarily because of the diversity, quality, and close proximity of its varied habitats. These habitats are particularly important to the wintering waterfowl of the Pacific Flyway and to the striped bass, which is the most important game fish in the San Francisco Bay and Delta System.

There are three types of wetlands in the Suisun Marsh: managed wetlands, tidal marshes, and seasonal marshes. Most of the wetlands in the Marsh are managed wetlands that are artificially flooded and cultivated by the California Department of Fish and Game and private duck clubs to enhance the production of preferred waterfowl food plants. The tidal marshes, which occur on the edges of the bays and sloughs, are not subjected to habitat management programs, but are exposed to the natural daily tidal rhythm. Seasonal marshes are found adjacent to the managed wetlands in several areas. They are low-lying lands that are flooded annually by winter and spring rains, and dry out with the approach of summer. Between the Marsh and adjacent uplands lies a "transition zone" of lowland grasslands, which supports a mixture of plants common to both the wetlands and the upland grasslands. Adjacent to the Suisun Marsh wetlands and lowland grasslands are upland grasslands and cultivated areas. These are used for extensive agriculture, such as grazing and grain production, and help protect the Marsh wetlands by insulating them from potential adverse impacts.

Findings

1. The Suisun Marsh and adjacent uplands provide a unique resource for a wide range of aquatic and wildlife species, due to the occurrence of many diverse habitats in close proximity to each other. This situation is the result of the natural estuarine character of the Suisun Marsh, the man-made habitat changes within the Marsh and the existence of extensively managed agricultural lands surrounding the Marsh.

2. The Suisun Marsh and adjacent uplands provide habitats for many rare and endangered plant and animal species. These include the giant garter snake, Aleutian Canada goose, bald eagle, peregrine falcon, California black rail, California yellow billed cuckoo, the salt marsh harvest mouse and seven plant species.

3. The Marsh sloughs are a major habitat for striped bass, the most important game fish in the San Francisco Bay and Delta system, and for the Neomysis shrimp, which is their primary food source. The Suisun Marsh provides a unique combination of low salinity level due to high Delta outflow, moderate temperatures, low pollution levels, availability of phytoplankton as food for Neomysis, and a gentle tidal current, all of which create an ideal environment for both the striped bass and Neomysis.

4. Tidal marsh is an important habitat for many wildlife species, including the endangered salt marsh harvest mouse and the Suisun shrew. Tidal marshes also contribute to the maintenance of water quality in the San Francisco Bay.

5. In the Suisun Marsh, about 50,700 acres of managed wetlands are currently maintained as private waterfowl hunting clubs and on publicly-owned wildlife management areas and refuges. Because of their extent, location and the use of management techniques to encourage production of preferred waterfowl food plants, managed wetlands of the Suisun Marsh are a vital component of the wintering habitat for waterfowl migrating south on the Pacific Flyway, and also provide cover, foraging and nesting opportunities for resident waterfowl. Managed wetlands also provide habitat for a diversity of other resident and migratory species, including other waterbirds, shorebirds, raptors, amphibians, and mammals. Managed wetlands can protect upland areas by retaining flood waters and also provide an opportunity for needed space for adjacent wetlands to migrate landward as sea level rises.

6. There are several seasonal marshes around the periphery of the managed wetlands. They have high value for marsh-related wildlife and also serve to buffer the Suisun Marsh to a certain extent from potential adverse ecological and aesthetic impacts.

7. The lowland grasslands adjacent to the Marsh constitute an important transition area between the Marsh and uplands and have high value for marsh-related wildlife, particularly when the wetlands are flooded and during periods of high hunting pressure in the Marsh. They also play an important role in insulating the Suisun Marsh from potential adverse impacts from adjacent land uses, such as water pollution, predation by domestic pets, and noise.

8. The upland grasslands and cultivated areas adjacent to the Suisun Marsh provide habitats for many species of wildlife that also inhabit the Marsh. Several species of migratory waterfowl, shorebirds, and upland game birds feed in these areas, which also provide a refuge from winter flooding and hunting pressures in the Marsh. Birds of prey range over the Marsh and adjacent uplands where the diversity of habitats ensures a varied and abundant source of food. The Potrero Hills grasslands are particularly important since they contain one of only two known golden eagle nest sites in Solano County.

9. The upland grasslands and cultivated areas adjacent to the Suisun Marsh are also critical to its protection. These undeveloped areas, presently used for extensive agriculture, function as a buffer for the Marsh, insulating it from potential adverse ecological and aesthetic impacts.

10. The fresh water habitats in streams tributary to the Marsh are important to the continued high quality of water in the Marsh sloughs. Tributary streams such as American Canyon and Jameson Canyon Creeks support important riparian vegetation along their banks. This vegetation helps to retain proper water temperatures in the stream chan-

nels and filter sediments that would be carried into the Marsh sloughs. It also provides an important habitat for Marsh wildlife, particularly birds, as well as insects and algae that are food for larger aquatic life.

11. The tributary streams are also important for migratory fish that spawn upstream from the Marsh. The Suisun, Green Valley, and McCoy Creeks have remained largely unobstructed by manmade structures and support the only remaining steelhead migratory runs in the Suisun Marsh area.

12. Eucalyptus trees are the major tree species of the Marsh and are important to wildlife, particularly birds, for roosting and nesting. The groves of eucalyptus on Joice and Grizzly Islands, which are heron and egret rookeries, are particularly critical.

Policies

1. The diversity of habitats in the Suisun Marsh and surrounding upland areas should be preserved and enhanced wherever possible to maintain the unique wildlife resource.

2. The Marsh waterways, managed wetlands, tidal marshes, seasonal marshes, and lowland grasslands are critical habitats for marsh-related wildlife and are essential to the integrity of the Suisun Marsh. Therefore, these habitats deserve special protection.

3. Existing uses should continue in the upland grasslands and cultivated areas surrounding the critical habitats of the Suisun Marsh in order to protect the Marsh and preserve valuable marsh-related wildlife habitats. Where feasible, the value of the upland grasslands and cultivated lands as habitat for marsh-related wildlife should be enhanced.

4. The eucalyptus groves in and around the Marsh, particularly those on Joice and Grizzly Islands, should not be disturbed.

Amended November 2007

Egret rookery on Joice Island

RECREATION AND ACCESS

The vast open expanse of the Suisun Marsh is the location of many recreational activities. The Marsh is well known for waterfowl hunting in California. In addition, several other forms of recreation, including fishing, upland game hunting, and water sports, are also popular in the Marsh. Nevertheless, there are opportunities for a greater diversity and amount of public recreation in the Marsh.

The recreational values of the Marsh, particularly for duck hunting, have been a significant factor in its preservation. Private duck clubs and public agencies, such as the Department of Fish and Game, have made considerable contributions to the improvement of the Marsh habitats for waterfowl as well as other wildlife.

Findings

1. The Suisun Marsh is a major open-space resource of the San Francisco Bay region, and recreation is the major human use of the Suisun Marsh. A major attraction of the Marsh for recreational use is its undisturbed open-space character.

2. Market hunting of waterfowl began in the Suisun Marsh in the late 1850s, and the first private waterfowl sport hunting clubs were established in the early 1880s. Demand for hunting opportunities has resulted in the protection from urban development of tens of thousands of acres of marsh habitat. Generations of hunting club owners and members have worked to maintain the area's habitat value and to protect the natural resources of the Marsh. Today, waterfowl hunting is the major recreational activity in the Suisun Marsh, occurring from late October until late January each year, though the private waterfowl hunting clubs and public wildlife areas of the Marsh are also used for a wide variety of other recreational activities, including upland game hunting, fishing, dog training, boating, hiking, photography, education, nature study, and wildlife viewing.

3. The demand for existing recreational uses of the Suisun Marsh is presently high and will probably increase in the future. There is also a high demand for water sports and passive recreational activities, such as nature walks, picnicking, and sightseeing. Participation in these activities would increase if better facilities were provided.

4. Approximately 15,400 acres of managed wetlands are publicly owned in the Suisun Marsh. Public wildlife areas of the Suisun Marsh are managed to meet multiple objectives, including enhancing wildlife habitat, as well as providing public recreational opportunities such as waterfowl hunting, fishing, wildlife viewing and hiking. Over time, waterfowl hunting on public lands has decreased while other types of recreation (including fishing and nonconsumptive recreational uses, such as wildlife viewing) have greatly increased.

5. Fishing accounts for nearly as much recreational use of the Marsh as waterfowl hunting. Public boat launches exist at Suisun City and Belden's Landing. Island Slough and Grizzly Island Wildlife Area both provide public fishing piers. Fishing is also allowed at unimproved sites in much of the publicly owned areas of the Marsh. Fishing at unimproved sites is accessed primarily on foot from designated parking areas. Some frequently used fishing sites may be dangerous because they are located on narrow roads and place fishermen in close proximity to passing automobiles.

6. Due to the diversity of vegetation and fish and wildlife species, the Suisun Marsh has high potential for scientific and educational use.

7. The Solano County Park Department has proposed parks for two sites in the Suisun Marsh: at Beldon's Landing on Montezuma Slough and on Hill Slough. These would increase opportunities for public access and recreation activities in the Marsh.

Policies

1. Continued recreational use of privately-owned managed wetlands should be encouraged. Additional land should be acquired within the Suisun Marsh to provide for increased public recreational use and additional refuge areas for waterfowl during the hunting season. Acquisition priority should be given to those lands not now operated as managed wetlands.

2. Land should also be purchased for public recreation and access to the Marsh for such uses as fishing boat launching and nature study. These areas should be located on the outer portions of the Marsh near the population centers and easily accessible from existing roads. Improvements for public use should be consistent with protection of wildlife resources.

3. Public agencies acquiring land in the Marsh for public access and recreational use should provide for a balance of recreational needs by expanding and diversifying opportunities for activities such as bird watching, picnicking, hiking, and nature study.

4. Agencies administering land acquired for public access and recreational use should be responsible for maintaining the areas and controlling their use. Signing on roads leading into the Marsh and maintained litter receptacles at major public use areas should be provided by the appropriate local or State agency to prevent littering and vandalism to public and private property.

5. Recreational activities that could result in adverse impacts to the environment or aesthetic qualities of the Suisun Marsh should not be permitted. Levels of use should also be monitored to insure that their intensity is compatible with other recreation activities and with protection of the Marsh environment. For example, boat speeds and excessive noise should be controlled and activities such as water skiing and naval training exercises should be kept at an acceptable level.

Amended November 2007

Fishing on Joice Island

LAND USE AND MARSH MANAGEMENT

The tidal marshes, managed wetlands, seasonal marshes, and the lowland grasslands of the Suisun Marsh represent a vital resource for many forms of Marsh wildlife. They play a particularly important role in providing wintering habitat for waterfowl of the Pacific Flyway and also constitute the habitat of many year-round residents, including shorebirds, wading birds, raptors, amphibians, rodents, and other mammals.

Because of their critical importance to Marsh wildlife, these areas should be included in a primary management area. Within this area, existing land uses should continue, and land and water areas should be managed so as to achieve the following objectives:

- Preservation and enhancement of Marsh habitat
- Provision of habitat attractive to waterfowl
- Improvement of water distribution and levee systems
- Encouragement of agricultural and grazing practices consistent with wildlife use, waterfowl hunting, and elimination of mosquito breeding
- Restoration of historic wetlands

Surrounding the primary management area is an area comprising upland grasslands and cultivated lands. The upland grasslands and cultivated lands provide habitat for Marsh-related wildlife, but more importantly, by their location and existing uses, they insulate the habitats in the primary management area from the adverse impacts of both urban development and other upland land uses and practices incompatible with Marsh preservation.

The upland grasslands and cultivated lands surrounding the primary management area should therefore be included in a secondary management area. The function of the secondary management area should be to act as a buffer area to insulate the habitats within the primary management area. Within the secondary management area, existing grazing and agricultural uses should continue, and agricultural practices favoring wildlife use and habitat enhancement should be encouraged.

The watershed of the Suisun Marsh is also directly related to the protection of the aquatic and wildlife resources of the Marsh. In particular, land uses in the watershed can affect water quality and supply. For example, toxic and hazardous materials introduced into streams entering the Marsh constitute a threat to the wetland habitats. Activities, such as improper grading during development, over-grazing, and construction on steep slopes or highly erodable soils, can lead to the transfer of soil materials to fresh water streams and ultimately to the Marsh. Moreover, riparian vegetation along tributary streams is important habitat to many species of Marsh wildlife and helps to maintain water quality in streams and sloughs.

To adequately protect the Marsh, control over runoff, erosion, and sediment transfer is necessary in the immediate Marsh watershed. Controls should also be established to limit disruption of riparian vegetation and habitat.

Findings

1. The tidal marshes of the Suisun Marsh are an important wildlife habitat and also contribute to the maintenance of water quality in the San Francisco Bay.

2. The managed wetlands are a unique resource for waterfowl and other Marsh wildlife, and their value as such is increased substantially by the management programs used by waterfowl hunting clubs and public agencies to enhance the habitat through the encouragement of preferred food plant species. However, management challenges exist on many managed wetland units, including: water quality concerns such as salinity; effective water circulation, conveyance and drainage due to subsided land; restrictions resulting from endangered species protection; and ongoing exterior levee system integrity and maintenance issues.

3. Individual management plans were developed for each waterfowl hunting club in the 1980s, and were reviewed by the California Department of Fish and Game and certified by the San Francisco Bay Conservation and Development Commission. The management plans include site information on each club's infrastructure, a water management schedule, and a discussion of management activities needed to accomplish the schedule. Land managers can conduct ongoing management activities described in the plans, such as maintenance, repairs, and enhancements, without having to apply for separate permits from the Commission for each activity.

4. The Suisun Marsh contains approximately 230 miles of levees, many of which have been constructed over time largely using material dredged from adjacent waterways and were not constructed to meet flood protection standards. Consequences of levee failure may include: risks to life; damage to residences, businesses, utilities, and transportation infrastructure; loss of recreational opportunities; changes in water quality conditions; loss of managed wetlands values and functions; and changes in ecosystem conditions. Appropriate methods of levee repair and maintenance can both protect managed wetlands and neighboring properties as well as avoid adverse impacts to wildlife habitat both on and adjacent to levees.

5. The tidal marshes and managed wetlands can also provide excellent conditions for mosquito production. The Solano County Mosquito Abatement District regulates Marsh management programs to ensure adequate mosquito control.

6. There are several seasonal marshes around the periphery of the managed wetlands. They have high value for Marsh-related wildlife and also serve to buffer the Suisun Marsh to a certain extent from potential adverse ecological and aesthetic impacts. The seasonal marshes are presently used for grazing during the dry summer months.

7. The lowland grasslands constitute an important transition area between the Marsh and the uplands which has high value to Marsh-related wildlife, particularly during the winter months when the wetlands are flooded. The lowland grasslands also play an important role in protecting the Suisun Marsh from potential adverse impacts resulting from adjacent land uses, such as water pollution, predation by domestic pets, and noise. Most of the lowland grasslands are presently used for grazing, which helps to maintain the habitat, providing that over-grazing does not occur.

8. Several areas adjacent to the wetlands were originally marshland but have been segregated from tidal action due to land reclamation, diking and filling for grazing purposes, cultivation or flood protection. Examples of historic marshes occur at Thomasson near Cordelia, east of Suisun City and in the area east of Montezuma Slough between Birds Landing and Collinsville. These areas could be restored to wetlands status by returning them to tidal action.

9. The tidal marshes, managed wetlands, adjacent lowland grasslands, and seasonal marshes are unsuitable for urban development due to several physical constraints. They are subject to periodic flooding and tidal action. They are also underlain by saturated soft Bay muds which tend to settle under structures. Soft Bay mud may also experience severe ground shaking and failure during earthquakes.

10. The upland grasslands and cultivated areas adjacent to the Suisun Marsh are critical to its protection. These undeveloped areas, presently used for grazing cattle and cultivated agricultural lands, function as a buffer for the Marsh. Development in the uplands adjacent to the Marsh would remove this protective function and result in potential adverse ecological and aesthetic impacts. Furthermore, these areas represent valuable habitats for many species of Marsh-related wildlife.

11. Soil conditions and seismic activity in the uplands adjacent to the Suisun Marsh may also create hazards to urban development. In addition, earth disturbance, such as grading and filling to enable development in hazard areas, can lead to erosion which degrades valuable aquatic and wildlife habitat due to sedimentation. For example, the Benicia hills west of Interstate 680 are steeply sloped, contain landslide deposits, include soils with high susceptibility to landslides and erosion, and are the location of the active Green Valley Fault. Major portions of the Potrero Hills are also steeply sloped with soils having high erosion potential. Other hills and mountains in the immediate Marsh watershed, particularly the hills around Rockville and the Vaca mountains, contain steep slopes with soils that are either easily eroded or susceptible to landslides.

12. Sediments carried into the Marsh by soil erosion in the watershed could degrade aquatic and wildlife habitats. They would probably cause higher water turbidity in the sloughs reducing light penetration into the water which may be very detrimental to phytoplankton populations which form the base of the Marsh fishery food chain. In addition, increased sedimentation can reduce the range of migratory fish spawning habitat and increase fish egg mortality.

13. Some areas of lowland grassland and seasonal marsh (notably east of Suisun City and east of Montezuma Slough) are historic marshlands and could be restored as tidal marshes or managed wetlands.

14. Physical barriers to wildlife movement are created by such structures as highways, railroad tracks, exposed pipelines, and fences. However such barriers can act to protect the Marsh from certain adverse impacts such as predation by domestic pets.

Policies

1. The managed wetlands, tidal marshes, lowland grasslands and seasonal marshes should be included in a primary management area. Within the primary management area, existing uses should continue and both land and water areas should be protected and managed to enhance the quality and diversity of the habitats.

2. Agriculture within the primary management area should be limited to activities compatible with, or intended for, the maintenance or improvement of wildlife habitat. These include extensive agricultural uses such as grain production and grazing. Intensive agricultural activities, involving removal or persistent plowing of natural vegetation and maintenance of fallow land during part of the year, should not be permitted. Grain production should be confined to the Grizzly Island Wildlife Area and relatively small, well-suited areas of some of the large waterfowl hunting clubs. Grazing should be used to control vegetation on waterfowl hunting clubs where plant cover is sub-optimum for waterfowl use and should be discouraged on those properties where there is already a good mixture of preferred waterfowl food plants. Grazing pressures should not exceed sound range management practices.

3. The tidal marshes in the primary management area should be preserved. Practices recommended by the Solano County Mosquito Abatement District to control mosquitoes, including ditching, drainage, pesticide application, burning, and the use of mosquitofish should be conducted only where absolutely necessary. Because of potential adverse environment impacts, pesticide application and burning for mosquito control should be applied only as a last resort. Efforts toward biological control of mosquitoes should be intensified.

4. The water management schedules originally developed by the U.S.D.A. Soil Conservation Service and the California Department of Fish and Game and ratified by the Solano County Mosquito Abatement District should be modified as necessary in response to new biological, technical and management challenges. Modified water schedules should include provisions for adaptive management (systematic process for evaluating and improving strategies) to better address management challenges and should be used to the maximum extent possible in the managed wetlands. Individual club management plans should include the most current water management schedules and management approaches. These schedules provide the most desirable habitat for waterfowl as well as many other types of Marsh wildlife, and may also result in a significant reduction of vector production if properly managed.

5. In order to improve the efficiency of water control management in the Marsh, the Suisun Resource Conservation District should be empowered to develop and enforce regulations establishing sound water management practices on all privately-owned managed wetlands within the primary management area.

6. The Suisun Resource Conservation District should be empowered to improve and maintain exterior levee systems as well as other water control facilities on the privately-owned managed wetlands within the primary management area.

7. Burning in the primary management area is a valuable management tool. However, it should be kept to a minimum to prevent uncontrolled fires which may destroy beneficial plant species and damage peat leaves, and to minimize air pollution.

8. Permanent ponds provide shelter and food for resident and migratory wildlife species, including waterfowl broods, molting waterfowl, pelicans and shorebirds. Permanent ponds should maintain high circulation rates and, where necessary, should be drained every three to five years to reset the vegetative composition. To control mosquito production, water levels in permanent ponds should be kept constant. Water salinity levels exceeding 17mS/cm may be toxic to ducklings and should be considered when managing permanent ponds.

9. The upland grasslands and cultivated lands surrounding the Marsh should be included in a secondary management area. The function of the secondary management area should be to act as a buffer area insulating the habitats within the primary management area from adverse impacts of urban development and other uses and land practices incompatible with preservation of the Marsh. The boundaries of the secondary management area should, for the most part, correspond to physical barriers to wildlife movement, with exceptions where necessary to control specific potential threats to the Marsh from beyond the wildlife barrier. The proposed boundary of the secondary management area is shown on the Protection Plan Map.

10. Agricultural uses consistent with protection of the Marsh, such as grazing and grain production, should be maintained in the secondary management area. In the event such uses become infeasible, other uses compatible with protection of the Marsh should be permitted. The value of the upland grassland and cultivated lands as habitats for Marsh-related wildlife should be maintained and enhanced where possible by planting or encouraging valuable wildlife food or cover plant species.

11. Existing non-agricultural uses, such as Solano Garbage Company, Pacific Reclamation and Disposal Inc., and Explosive Technology Corporation, on sites within the secondary management area should be allowed to continue if they are conducted so that they will not cause adverse impacts on the Suisun Marsh. Any future change in uses of these sites should be compatible with the preservation of the Suisun Marsh and its wildlife resources.

12. Exceptions to the land management practices recommended for the primary and secondary management areas should be made in the Collinsville area. The Collinsville area has potential for water-related industry and port use due to its location adjacent to a deepwater channel. Therefore, the upland grasslands, seasonal marshes, and lowland grasslands west of Collinsville Road, as identified on the Protection Plan Map, should be reserved for water-related industry and port uses. Present extensive agricultural practices should be continued until this site is needed for water-related industrial or port development. However, wetland resources on portions of this site may be enhanced or restored consistent with *Suisun Marsh Protection Plan* policies on water-related industry.

    Any wetland restoration or enhancement project should provide for the protection of adjacent property from flooding that could occur because of the project and should include a long-range management program that assures proper stewardship of the wetland.

    The area between the industrial area and Montezuma Slough varies from 1/3-1 mile wide and consists of extensive lowland grasslands and seasonal marshes. These habitats are included within the primary management area and will also, due to their size,

be able to function as an adequate buffer to protect the wetlands from potential adverse impacts of any future industrial or port development in the Collinsville area. In addition, this area, which is presently used for grazing, is historic marshland and some or all should be restored to wetland status through such actions as raising site elevations through placement of approved dredged materials, breaching levees, or improving water management practices.

13. Where feasible, historic marshes should be returned to wetland status, either as tidal marshes or managed wetlands. If, in the future, some of the managed wetlands are no longer needed for private waterfowl hunting, they should be restored to tidal or subtidal habitat, or retained as diked wetland habitat and enhanced and managed for the benefit of multiple species. Sound practices consistent with Marsh preservation recommended by the Solano County Mosquito Abatement District to control mosquitoes should be followed during and after marsh restoration.

14. Ongoing management activities, such as maintenance, repairs and enhancements, that are undertaken on managed wetlands in accordance with certified individual management plans should continue to be allowed without the need for further authorization from the Commission. On those managed wetlands no longer needed for private waterfowl hunting, any project for the restoration, enhancement or conversion of managed wetlands to subtidal or wetland habitat should include clear and specific long-term and short-term biological and physical goals, success criteria, a monitoring program, and provisions for long-term maintenance and management needs. Design and evaluation of the project should include an analysis of:

    (a) The anticipated habitat type that would result from managed wetland conversion or restoration, and the predicted effects on the diversity, abundance and distribution of fish, other aquatic organisms and wildlife;

    (b) Potential fill activities, including the use of fill material such as sediments dredged from the Bay and rock, to assist restoration objectives;

    (c) Flood management measures;

    (d) Mosquito abatement measures;

    (e) Measures to control non-native species;

    (f) Opportunities for a diversity of public access and recreational activities; and

    (g) Water quality protection measures that may include monitoring for constituents of concern, such as methylmercury.

15. Any development in the Suisun Marsh watershed or secondary management area proposed for areas that have poor soil conditions for construction or that are seismically active, should be controlled to prevent or minimize earth disturbance, erosion, water pollution, and hazards to public safety. Local runoff, erosion, and sediment control ordinances should be established in the immediate Suisun Marsh watershed to protect the Marsh from these potential adverse effects.

16. Riparian vegetation in the immediate Suisun Marsh watershed should be preserved, due to its importance in the maintenance of water quality and its value as Marsh-related wildlife habitat. Stream modification should only be permitted if it is proved necessary to ensure the protection of life and existing structures from floods and only the minimum amount of modification necessary should be allowed.

17. State and federal agencies and the Solano County Mosquito Abatement District should continue and expand their research efforts on Marsh management with the objective of improving wildlife habitat, preserving rare and endangered species and controlling mosquitoes. These agencies and the Suisun Resource Conservation District should periodically conduct joint reviews of Marsh management programs to ensure that they are compatible with one another and consistent with the policies of the *Suisun Marsh Protection Plan*.

Amended November 2007