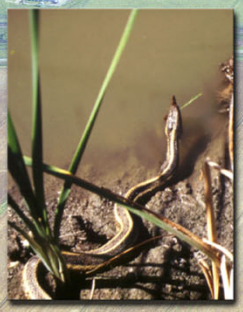
Natomas Basin Conservancy



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Sacramento, CA 95833

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The Natomas Basin

The Natomas Basin, located in Northern California's Sacramento Valley, was once a mosaic of winding channels and verdant marshes bordered by floodplains, riparian woodlands and native grasslands. A variety of resident wildlife, from herons and egrets to jackrabbits, played their roles in the complex ecosystems. Countless waterfowl used the basin on their annual migrations.

Beginning in the early 1900s, most of the Basin was drained for agriculture and flood protection. Some species of wildlife were able to continue living in the fields, margins and drainage ditches. In the 1990s, many farms were converted to urban development, placing pressure on the remaining habitat.

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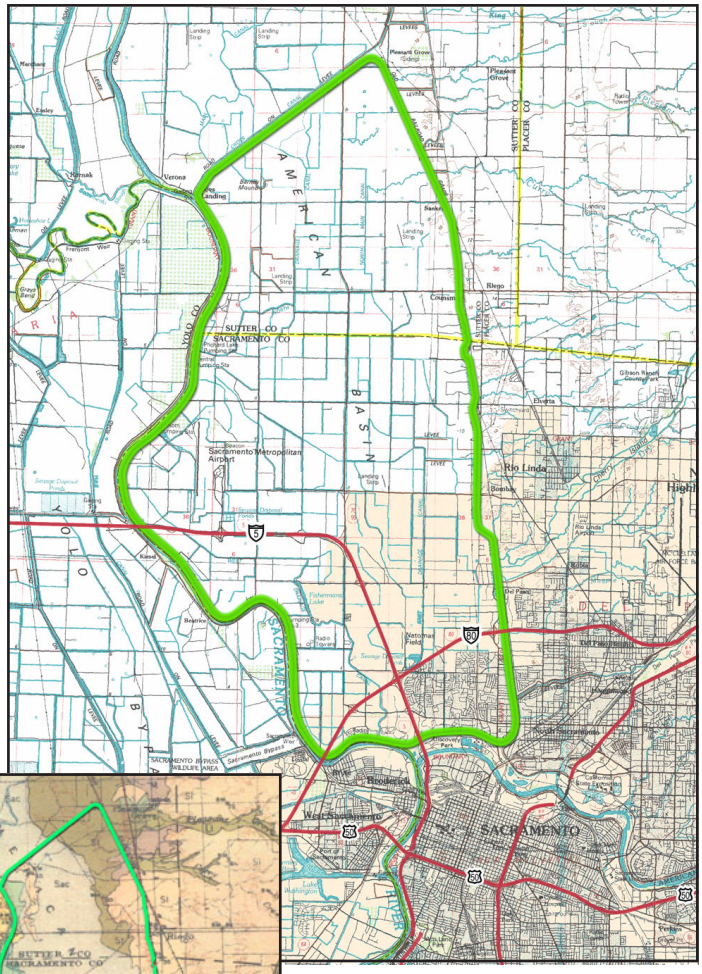
The Natomas Basin became the focus of competing needs between wildlife habitat preservation, urban development, agriculture, and flood control. Creative public solutions were needed to resolve the conflict between habitat needs, agriculture and development. To facilitate orderly development of the Basin while preserving habitat for multiple species, a habitat conservation plan was proposed.



adapted from USGS

Right: Location of the Natomas Basin

Below: This soils map published by the U.S. Department of Agriculture in 1915 shows that the land forms of the Natomas Basin were predominantly basins and low terraces. These are landscapes that naturally support marshes and floodplains.

The Habitat Conservation Plan

A decade-long habitat conservation planning process culminated in 1997 with approval of the Natomas Basin Habitat Conservation Plan (NBHCP) by the U.S. Fish and Wildlife Service and the California Department of Fish and Game. The NBHCP's goal is to promote a balance between biological conservation and economic development along with the continuation of agriculture within the Natomas Basin. To achieve this goal, the NBCHP established a multiple-species conservation program. It forecasts the expected impacts of urban development on species and habitats, and provides a plan by which those impacts can be mitigated.

Left: the Swainson's hawk is one of the target species of the NCHCP

Top: An irrigation ditch bordering a Natomas Basin Conservancy preserve

Bottom: Urban development in the Natomas Basin continues to expand

Q: How many acres of rice are grown in the Natomas Basin each year?

A: Nearly 20,000 acres

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The Natomas Basin Conservancy

The Natomas Basin Conservancy is a private, non-profit organization that began operating in December 1998. Its mission is to serve as "plan operator" of the NBHCP. It is guided by a Board of Directors appointed by the City of Sacramento.

The Conservancy receives mitigation fees paid by developers and others when permits are obtained to build within the Basin. The funds are used to acquire lands for habitat preserves, to design and construct wildlife reserves and sanctuaries, and to manage the lands.

The Conservancy's land is designed to provide marsh, riparian, and grassland habitats. Rice fields that are specially managed to be wildlife-friendly are a significant part of the Conservancy's preserves.

Photo provided by The Natomas Basin Conservancy

The "No Trespassing" sign proclaims these rice fields to be Natomas Basin Conservancy lands set aside as a special preserve and sanctuary for some of the NBHCP-covered species.

Top: Water is directed into newly constructed marsh habitat

Middle: A member of the land stewardship team records the elevation of water control structures

Bottom: Sandpipers and stilts utilize the new habitat

The Conservancy has acquired nearly 3,000 acres of mitigation land within the Natomas Basin. Habitat design and management plans have been developed, and habitat construction has already been completed on several Conservancy properties. Many species of wildlife have moved into newly constructed habitat areas before the construction work was even finished.

These preserves benefit the species covered in the NBHCP's multiple species program by providing high-quality, protected habitat.

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Basin Wildlife

The multiple-species program of the NBHCP addresses a total of 26 wetland and upland plant and animal species. The giant garter snake and Swainson's hawk are its primary focus.

Giant Garter Snake

The giant garter snake (GGS) originally inhabited many of the Central Valley's historic marshes, hunting for fish and other small prey. Having lost well over 90 percent of its historical habitat in the last 100 years, the GGS is now listed as threatened by the state and federal endangered species acts.

Photo provided by The Natomas Basin Conservancy

Most of the remaining GGS populations make use of the limited habitats in rice fields and irrigation ditches and are in danger of losing what little habitat remains as farmlands are converted to urban development.

Q: What do giant garter snakes eat?

See next page for answer and more interesting facts about GGS!

Channels and ditches bordered by marsh vegetation provide part of the giant garter snake's habitat needs

Giant Garter Snake Fact Sheet

Scientific Name:
Thamnophis gigas

Appearance: up to five feet long; brown with dark spots, plus light stripes running along the body; lighter color underneath

Habitat: Endemic to California's Central Valley; the GGS requires an aquatic environment for foraging, with vegetation for cover, plus upland areas for basking and hibernating

Food: minnows and other aquatic prey

Conservancy habitat preserves include created and restored marshlands for giant garter snake foraging grounds, interspersed with upland areas for basking and refuge. Rice farming on Conservancy lands follows strict management practices for protecting the snakes.

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Swainson's hawk

Historically, the Swainson's hawk winged over native prairie grasslands and seasonal wetlands, foraging for voles and other rodents. With the loss of native grasslands, it has become adept at using dry-land farmlands such as row crops, alfalfa, and grain for hunting grounds. As today's farmlands are converted to urban development, the hawk has lost much of its hunting habitat. Tall trees, which the hawk used for nesting, have also declined. Under these pressures, the Swainson's hawk has diminished in numbers and is now listed as threatened by the State of California.

Q: How far does the Swainson's hawk migrate?

See next page for answer and more interesting facts about the Swainson's hawk!

Conservancy habitat preserves include plantings of cottonwoods and oaks in proximity to native grasslands and specially managed farmlands to provide the Swainson's hawk with both nesting and hunting habitat.

Swainson's hawks nest in tall trees, and use them as lookouts for spotting prey in the grasslands below.

Swainson's Hawk Fact Sheet

Photo provided by The Natomas Basin Conservancy

Scientific Name:
Buteo swainsoni

Appearance: Light morph hawks (right) are most common and have white on forehead and throat. Dark (opposite page) and intermediate morphs also occur.

Habitat: Tall trees for nesting, often found in riparian or oak savannas. Grasslands for foraging. The Swainson's hawk prefers short-grass fields for spotting prey.

Food: meadow mice and other rodents, plus insects and other small prey

Migration: Many of California's populations winter in Mexico, Central America, and as far as 6,000 miles away in Argentina.

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Other Species

Habitat improvements in the Natomas Basin will benefit many other species as well as the giant garter snake and Swainson's hawk. Examples include the burrowing owl, the tricolored blackbird and the white-faced-ibis.

Top: Burrowing owls
Middle: White-faced ibis
Bottom: Tricolored blackbird

Burrowing owls are an important covered species found on existing Conservancy lands. The owls nest and forage in grazed grasslands preserved, restored and enhanced by the Conservancy.

The tricolored blackbird nests in brambles along emergent marshes. The Conservancy's lands support one of the region's largest remaining populations of nesting tricolored blackbirds. Ongoing restoration and enhancement work on Conservancy land will create additional nesting and foraging habitat.

The white-faced ibis was once a common year-round resident of the shallow marshes of the Central Valley. After a long-term decline in local breeding populations, the ibis is making a return as a nesting species.

Species addressed in the NBHCP: Endangered, Threatened, and Species of Concern

Habitat & Species	Federal Status	State Status	Habitat Notes
Wetland Associated Species			
Aleutian Canada goose *Branta canadensis leucopareia*	T		Grazes in marshes and stubble fields, roosts on the water
Swainson's hawk *Buteo swainsoni*		T	Breeds in riparian forest; known nesting sites in trees along Sacramento River in Natomas Basin
giant garter snake *Thamnophis gigas*	T	T	Forages in low gradient open waterways and flooded rice fields; hibernates in canal berms and other uplands; several known occurrences in Natomas Basin
white-faced ibis *Plegadis chihi*	SC	SSC	Forages in flooded rice fields
bank swallow *Riparia riparia*		T	Nests in river banks, forages for insects over open water, croplands, and grasslands
American peregrine falcon *Falco peregrinus anatum*	E	E	Preys on birds, including waterfowl in and around wetlands
greater sandhill crane *Grus canadensis tubida*		T	Forages in moist croplands with stubble and emergent wetlands
tricolored blackbird *Agelaius tricolor*	SC	SSC	Nests in marshes with bulrush, blackberry or cattails; three known occurrences in Natomas Basin
northwestern pond turtle *Clemmys marmorata marmorata*	SC	SSC	Lives in permanent bodies of water; requires floating vegetation, logs, rocks or banks for basking
valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T		Live and reproduces on elderberry shrubs found along rivers and canals
delta tule pea *Lathyrus jepsonii* ssp. *jepsonii*	SC		Perennial twining vine occurs in both riparian and marsh habitats
Sanford's arrowhead *Sagittaria sanfordii*	SC		Tuberose perennial likely to occur in drainage or irrigation ditches

Source: Exhibit B, Natomas Basin Habitat Conservation Plan

continued on next page

Note that some species occur in more than one habitat category and thus are listed twice.
A total of 26 species are included in the table and are covered by the permits.

Key to Abbreviations

Federal
- **E** Listed as Endangered
- **T** Listed as Threatened
- C Candidate for federal listing, data sufficient
- SC Species of Concern – informal category, formerly called candidate 2 species (data for listing insufficient)

State
- **E** Listed as Endangered
- **T** Listed as Threatened
- R Listed as Rare
- SSC Species of Special Concern

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Species Addressed in the NBHCP: Endangered, Threatened, and Species of Concern *continued*

Upland Associated Species			
Swainson's hawk *Buteo swainsoni*		T	Forages for small mammals in grasslands and croplands
tricolored blackbird *Agelaius tricolor*	SC	SSC	Forages on the ground in grasslands and croplands; three known occurrences in Basin
loggerhead shrike *Lanius ludovicianus*	SC	SSC	Prefers open habitats with scattered shrubs, trees, fences, and posts. Will use cropland.
burrowing owl *Athene cunicularia*		SSC	Prefers open, dry grassland and desert habitats
Vernal Pool Associated Species			
Conservancy fairy shrimp *Branchinecta conservatio*	E		Vernal pool obligate; inhabits large, turbid pools; six disjunct populations known
vernal pool fairy shrimp *Branchinecta lynchi*	T		Vernal pool obligate; widely distributed in Sacramento County
vernal pool tadpole shrimp *Lepidurus packardi*	E		Vernal pool obligate; widely distributed in Sacramento County
longhorn fairy shrimp *Branchinecta longiantenna*	E		Vernal pool obligate; inhabits long-lasting pools; four disjunct populations known
midvalley fairy shrimp *Branchinecta n. sp.*			Vernal pool obligate often found in small pool; likely to occur in plan area
California tiger salamander *Ambystoma californiense*	C	SSC	Winters in ground squirrel burrows or other holes; breeds in vernal pools
western spadefoot toad *Scaphiopus hammondii*	SC		Primary habitat is grasslands; breeds in shallow temporary pools
Colusa grass *Neostapfia colusana*	T		Occurs in large deep pools with substrates of adobe mud but also in smaller pools; known in Yolo County
Boggs Lake hedge-hyssop *Gratiaola heterosepala*		E	Low-terrace species found in shallow water margins of vernal pools
Sacramento Orcutt grass *Orcuttia viscida*	E	E	Found in relatively large, deep vernal pools in eastern Sacramento County
slender Orcutt grass *Orcuttia tenuis*	T	E	Associated with vernal pools in the Coast Ranges and Cascade Foothills; sometimes found in shallower pools
legenere *Legenere limosa*	SC		Found in wet places or vernal pools below 400 feet in elevation

Legenere

Sandhill cranes

Northwestern pond turtle

The Natomas Basin Conservancy Habitat Preserves

Goals

Under the current NBHCP, which has a 50-year lifespan, 17,500 acres will be urbanized and 8,750 acres of habitat preserve land will be established. Approximately half of the preserve land is designated for habitat-friendly rice farming, with the rest divided between managed marsh and upland preserves.

Typical preserve

Acquisition and Site Analysis

As funds become available from mitigation fees, the Conservancy buys land for each new habitat preserve. The land is surveyed for conditions that affect restoration plans, such as past wetland occurrences, position in landscape, water supply, soil types, and the presence of existing wetlands or special-status species. A habitat plan is designed for the site, making the best use of its natural attributes while aiming for the total acreage goals described above. Some sites will be kept almost entirely in rice production, while others will include some creation and restoration of managed marsh and upland habitats.

Acreage Breakdown

The Natomas Basin	=	*53,341*
Acreage covered by the current NBHCP:		
Planned development	=	*17,500*
Habitat preserves	=	*8,750*
Allocation of habitat preserve land:		
Managed marsh	=	*at least 25%*
Upland habitats	=	*up to 25%*
Rice farming	=	*approx. 50%*

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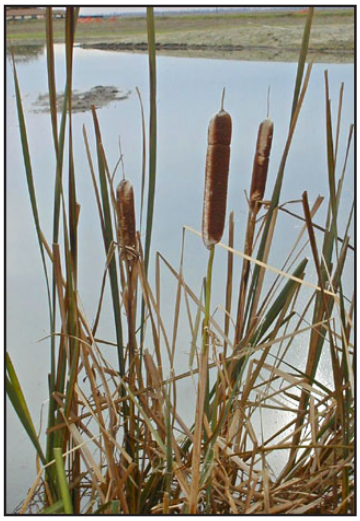
Habitat Restoration and Preserve Stewardship



Managed Marsh: Managed marsh complexes are created by recontouring the land into winding channels and back-water sloughs, planting native vegetation, and providing perennial water. To a giant garter snake, the newly created channels offer an abundance of fish and frogs for prey, and the grassy berms provide basking, resting and escape cover. The Conservancy provides stewardship of the marshes that includes water management in order to promote perennial and seasonal marsh vegetation that will provide habitat structure for marsh-dwelling species.

Upland Habitats: The Swainson's hawk needs upland and riparian areas for foraging and nesting habitat. Restoring fields to native grassland creates excellent habitat for voles and other prey the hawk consumes. Pastures and fallow crop lands are also managed to support a good prey base. One such technique is to periodically mow or graze the vegetation to keep it short enough for the hawk to find its prey.

The hawk also needs nesting habitat, which requires riparian woodlands and isolated tall trees. Several Conservancy habitat preserves include existing wooded corridors, as well as new plantings of oaks, cottonwoods, sycamores, and other native trees and shrubs that contribute to a healthy ecosystem.

Rice Farming: Maintaining 50 percent of the Conservancy habitat preserve lands in rice production serves cultural, ecological, and economic purposes.

Q: How much rice is left in the fields after harvest, and what is it good for?

A: Between 150 and 350 pounds of rice per acre is left over in the fields, lost to the harvester. This becomes an important source of food for meadow mice (microtus), the primary prey species for Swainson's hawk and many other birds.

The qualities that originally made the Basin a productive and complex natural ecosystem also made it fertile for farming. Soils that formed in ancient basins and marshes presented a challenge to early farmers trying to grow familiar crops such as wheat, but proved to be well-suited for growing rice. Today the Sacramento Valley is known for the highest rice yields in the world. Dedicating some of the Conservancy lands to rice fields helps sustain the agricultural tradition of the Basin.

Conservancy tenant-farmers follow management practices that provide good quality habitat for the giant garter snake and minimizes the potential for harming the snakes.

Finally, the Conservancy's rice lands also provide income to help finance long-term stewardship of the habitat preserves.

Wildlife biologists have documented the occurrence of giant garter snakes in this ditch bordering a Conservancy rice field.

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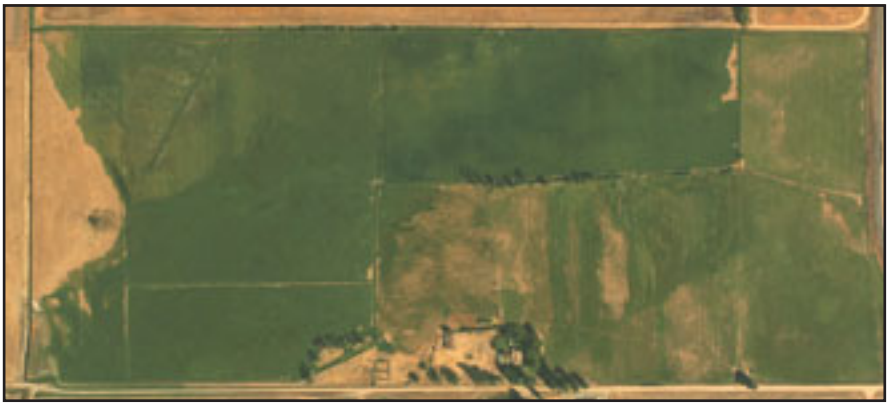
Sequence in Creating Habitat

Before habitat creation (aerial photograph): grazed and fallowed agricultural land



Design stage: Concept for creating mosaic of habitat uses

After habitat construction, but before significant vegetation development (aerial photograph): Constructed habitat includes ponds, sloughs, marshes, upland basking mounds, and grassland areas.

Looking Ahead

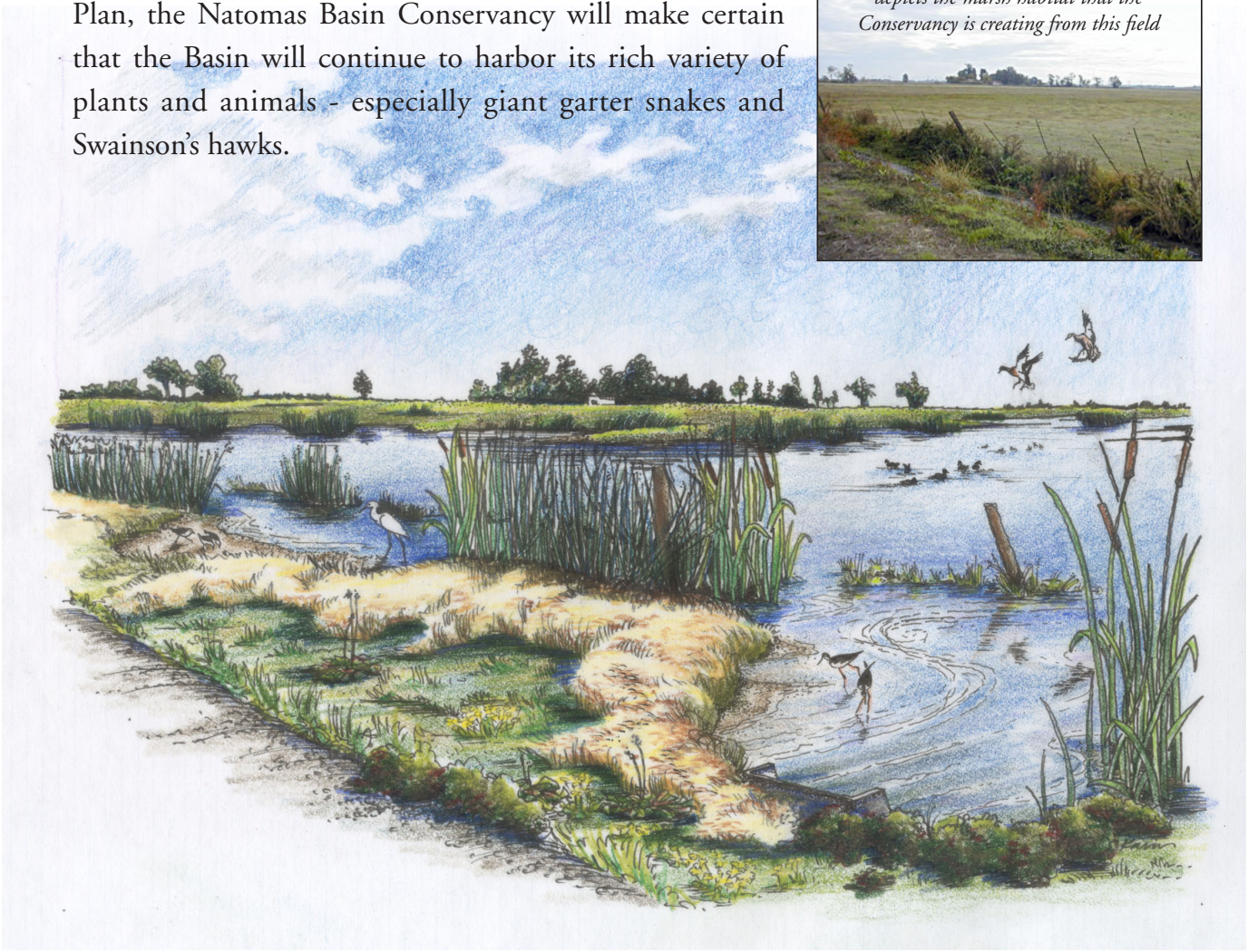
In a growing urban environment, natural lands that remain are cherished. The intrinsic value of nature and wildlife are further enhanced by the realization that open spaces have practical benefits, such as helping to ameliorate pollution and moderating climate effects. Most of all, natural landscapes, systems, and wildlife are protected for future generations.

The Natomas Basin Conservancy's habitat preserves form a part of that heritage. Creating preserves according to a regional plan prevents the habitat fragmentation that would occur with haphazard mitigation. The planned approach also provides for habitat creation and management that is cost-effective.

There are economic benefits as well. The plan allows for permitted, managed development to occur, and assures an agricultural presence in the Basin.

By implementing the Natomas Basin Habitat Conservation Plan, the Natomas Basin Conservancy will make certain that the Basin will continue to harbor its rich variety of plants and animals - especially giant garter snakes and Swainson's hawks.

Can you see the future? An artist's rendering depicts the marsh habitat that the Conservancy is creating from this field



More information

The Conservancy makes information available to interested parties. The best place to start is at the Conservancy's web site at: www.natomasbasin.org. Copies of the Natomas Basin Habitat Conservation Plan can be obtained by contacting the Conservancy at its offices in Sacramento:

The Natomas Basin Conservancy
1750 Creekside Oaks Drive, Suite 290
Sacramento, CA 95833

Information is also available from these sources:

California Department of Fish and Game
Habitat Conservation Planning Branch
1416 Ninth Street, Sacramento, CA 95814
916-653-4875

California Department of Fish and Game
Conservation Education
1416 Ninth Street, Room 1240, Sacramento, CA 95814
916-653-6420

Q: Who is the most important person in preserving our environment?

A: You are! Your values, priorities and actions will determine our legacy to future generations.

Glossary and Abbreviations

CDFG California Department of Fish and Game

Conservancy The Natomas Basin Conservancy. A California non-profit public benefit corporation serving as "plan operator" of the Natomas Basin Habitat Conservation Plan.

Giant garter snake (GGS) *(Thamnophis gigas)* The giant garter snake is one of the largest garter snakes of the genus Thamnophis, with a total length up to 4.5 feet or greater. The garter snake in the Sacramento Valley and Delta regions has a dorsal ground color often dark brown to olive or nearly black, a complete dorsal strip varying in color from dull yellow to bright orange, and often orange on the ventral surfaces as well. Officially listed as a "threatened" species under federal and state authority, it is one of the two primary species protected under the NBHCP.

Managed marsh Seasonal or perennial wetland managed for habitat values for the giant garter snake, a federally protected species, and other covered species. Such land must meet minimum requirements as described in the NBHCP which include, but are not limited to, an assured water supply that will serve the marsh from April through September of each year. The marsh will be a combination of open water, land with wetland vegetation, and other upland areas and may include a buffer area at the periphery. The Conservancy must develop detailed management plans pursuant to Chapter IV, Sections C.1 and D of the NBHCP for those Conservancy lands designated as managed marsh, in coordination with and subject to the approval of the CDFG and USFWS.

Natomas Basin Habitat Conservation Plan (NBHCP) The NBHCP applies to the 53,341-acre interior of the Natomas Basin, located in the northern portion of Sacramento County and the southern portion of Sutter County. The Basin contains incorporated and unincorporated areas within the jurisdiction of the City of Sacramento, Sacramento County and Sutter County. The purpose of the NBHCP is to promote biological conservation along with economic development and the continuation of agriculture within the Natomas Basin. The NBHCP establishes a multi-species conservation program to mitigate the expected loss of habitat values and incidental take of protected species that would result from urban development, operation of irrigation and drainage systems, and rice farming. The goal of the NBHCP is to preserve, restore, and enhance habitat values found in the Natomas Basin while allowing urban development to proceed according to local land use plans. The NBHCP is a supporting document for federal Section 10(a)(1)(B) and State Section 2081 permit applications. Section 10(a)(1)(B) of the federal Endangered Species Act allows incidental take of endangered or threatened species subject to its permit requirements. Similarly, State Section 2081 of the California Fish and Game Code allows the California Department of Fish and Game to enter into management agreements that allows activities which may otherwise result in habitat loss or take of individuals of a state listed species.

Permit or incidental take permit A permit issued by the USFWS under Section 10 (a)(1)(B) of the federal Endangered Species Act which authorizes the incidental take of a covered species which may occur as a result of urban development, rice farming and management activities with the permit area. Permit may also be used to collectively refer to Section 10 (a)(1)(B) permit, and the Section 2081, management authorization, of the State of California.

Swainson's hawk *(Buteo swainsoni)* The state-listed threatened Swainson's hawk is a medium sized buteo (25 to 35 ounces) and is distinguished from other buteos by long, narrow, pointed wings. Swainson's hawk plumage varies greatly. Light phase birds have buff white wing linings with darkly barred brown flight feathers; dark phase birds are dark brown with white undertail coverts, and intermediate reddish plumage occurs between phases.

TAC Technical Advisory Committee. The TAC consists of six members, two each appointed from the City of Sacramento, the California Department of Fish and Game and the U.S. Fish and Wildlife Service.

USFWS United States Fish and Wildlife Service.