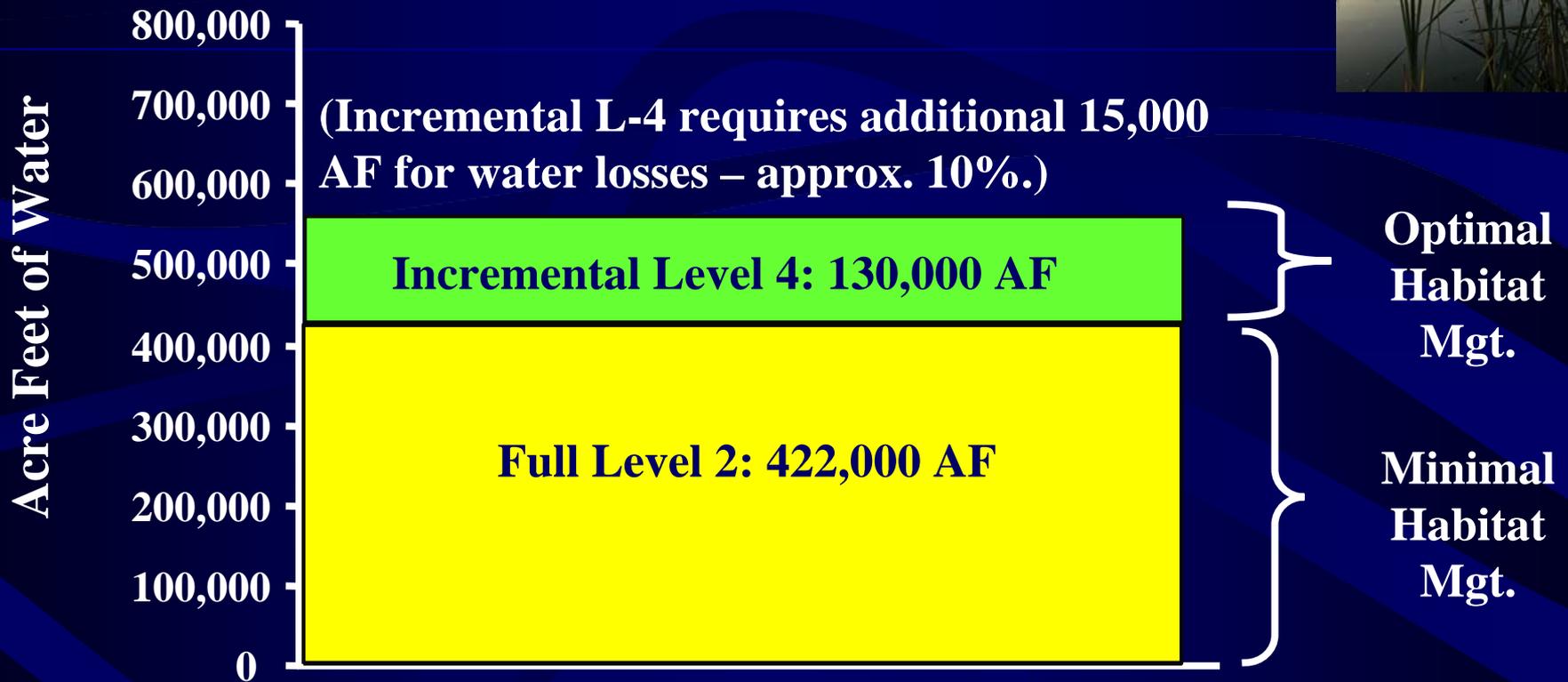




CVPIA Refuge Biological Benefits



Defining Level 2 and Level 4 Refuge Water Supply



CVPIA Refuge Biological Benefits

- Year-around water supplies
 - Long-term management planning
 - Accurate habitat management evaluations
 - Water for on-refuge restoration projects
 - Increased hunting/birding opportunities
 - Increase in diversity of habitat and wildlife species use



Year-Round Habitat Needs

August

Early Fall Habitat

September

Primary Fall Flood-Up

October

November

December

Mid-Winter Maintenance Flows

January

February

Late Winter Staging Habitat

March

April

Spring Riparian Habitat

May

Spring/Summer Irrigations

June

Spring/Summer Brood Habitat

July

(Level 2 Supply)

(Inc. Level 4 Supply)

Early Fall Habitat

Benefit to early migrants such as white-fronted geese and northern pintails

May be only quality habitat available in Valley



Grasslands - -An annual increase in typical mid-September waterfowl numbers by over 300% since 1992



Early Fall Habitat

Since CVPIA, a dramatic increase in sandhill crane use at **Pixley NWR**:

- 200 in 1992
- 2,000 in 1993
- 5,100 in 2001
- 7,000 in 2008



Early Fall Habitat

- Pixley sandhill crane use increased from a typical 5,000 to 7,000 in 2008- - due, in part, to lack of other available habitat in the southern San Joaquin Valley.



Early Fall Habitat

- **Grasslands** - - An increase of 3,000 acres of early fall habitat :

Shorebird bird-use day increases of 49% from 1992 to 1994

Recognized WHSRN area of international importance to shorebirds





Sacramento NWR

Major cholera outbreaks in 1991 and 1992...only one major outbreak since CVPIA passed



Mid-Winter Maintenance Flows

Improved Water
Quality

Reduction in Avian
Disease

Merced NWR – Ross' Geese fattening up in March and April before the long flight north



Late Winter Staging Habitat

Critical to birds
preparing to migrate
north to breeding
grounds

Spring Riparian Habitat

Vital to Neo-tropical birds
and colonial waterbirds



Kern NWR - - Great blue heron rookery
established in 1998

35 nests counted in 2006

Area also utilized by egrets, cormorants
and night-herons



Grasslands: yearly irrigated acreage of swamp timothy

1991-1992 : 4,000 acres

1993-today: approx. 26,000 acres annually

A doubling of plant biomass
Reduction in salts



Spring/Summer Food Plant Irrigations

Critical source of carbohydrates for wintering waterfowl



Spring and Summer Breeding Habitat

Improves waterfowl
breeding habitat and nest
success

Cinnamon Teal Broods, **Delevan NWR**





Spring and Summer Breeding Habitat

Kern NWR - Tri-colored blackbird habitat and nest success improved

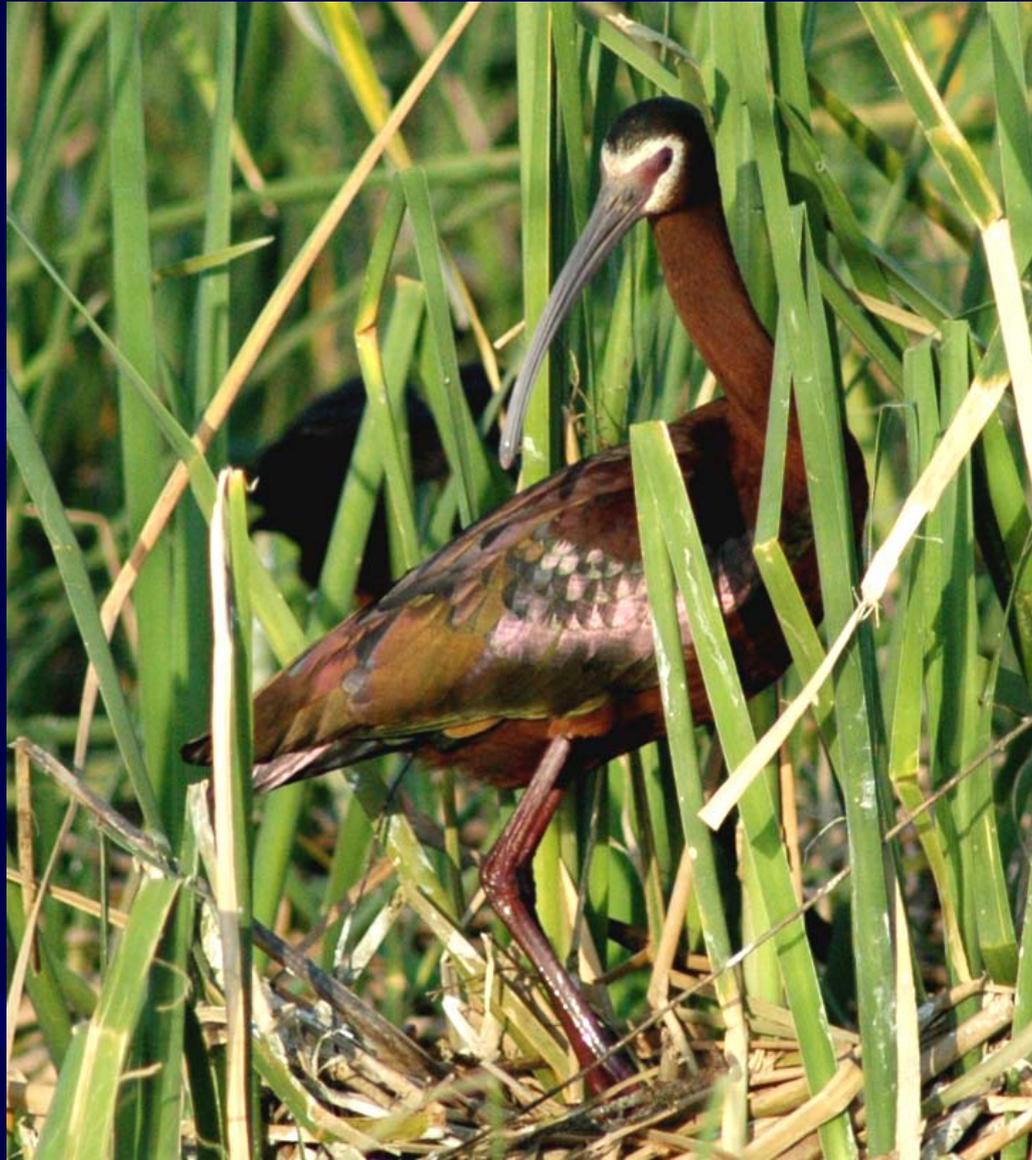


Spring and Summer Breeding Habitat

- Colusa NWR - Increase in habitat available for species of concern such as the western pond turtle and the giant garter snake



The Return of the White-faced Ibis



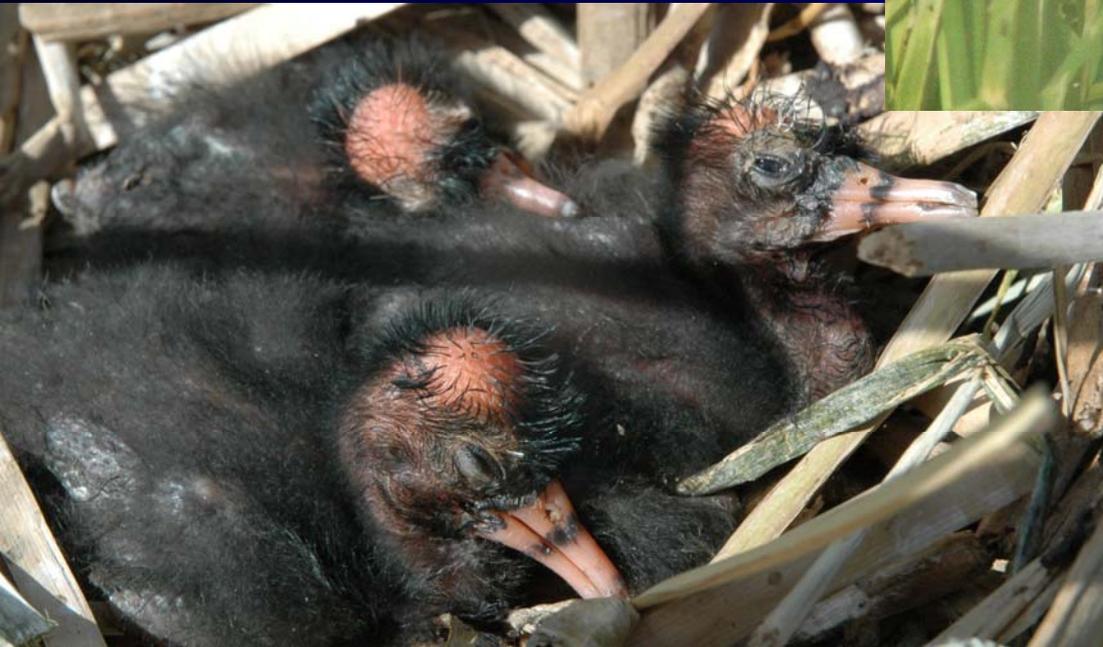
The Return of the White-faced Ibis

Populations began a steady decline in the late 1970's.

By 1990 had become “species of special concern”.



The Return of the White-faced Ibis



CVPIA water supplies provide for critical spring and summer nesting habitat.

- **Sutter NWR**
 - 1991: 100 birds to 1,000 in 2000, 7,000 in 2001, 2000: 1,000 and 15,000 in 2002
- **Kern NWR**
 - An increase from 50 birds in 1993, to 5,600 in 2001, to 17,000 in 2005





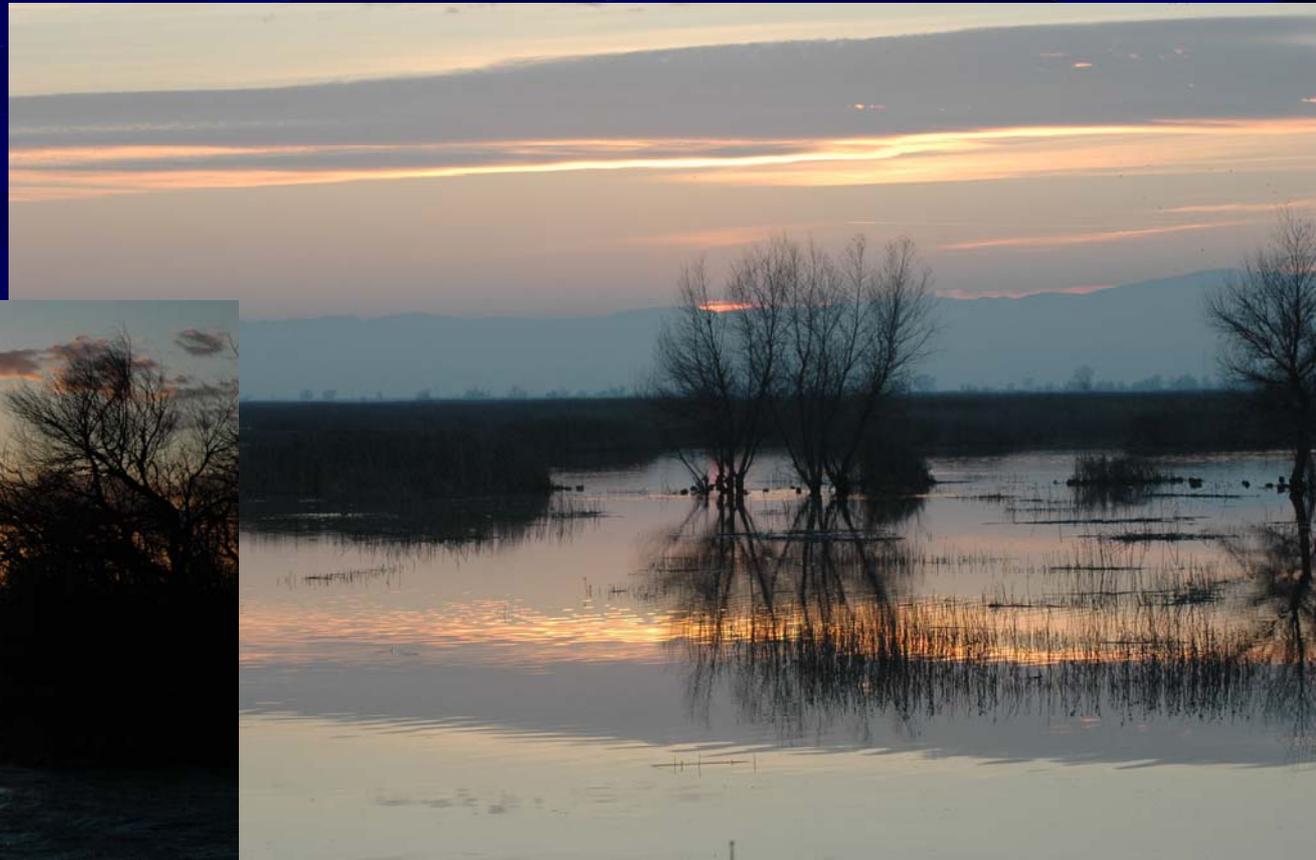
Kern National Wildlife Refuge



Kern National Wildlife Refuge

- Established in 1964
- Helps offset the loss of Buena Vista and Tulare Lakes
- 10,600 total acres (6,500 acres of managed wetlands)
- No historical firm water supplies
 - Surplus State Water supply
 - Floodwater flows
 - Groundwater Wells

Kern National Wildlife Refuge



Kern NWR Habitat Benefits

- 2004 : First year that all wetland habitat on refuge flooded
- CVPIA supplies provide make deep water/rookery habitat available for the first time
- An increase in tri-colored blackbirds throughout the late 1990's – 21,000 in 2003
- Multiple food plant irrigations most years
- Improved water quality with flow-through maintenance water

Kern NWR Ibis Numbers

1993: 50

2001: 5,600

2006: 15,000

2008: 900



Kern NWR Water Supply

- Incremental Level 4 Water Supply
 - CVPIA Allocation: 15,050 acre-feet
 - First Capable of receiving it in 2003
 - Amt. Delivered 2006: 11,523 acre-feet
 - Amt. Delivered 2007: 7,538 acre-feet
 - Amt Delivered 2008: 4,022 acre-feet



Kern NWR 2006 vs. 2008

- Public Use:
 - Down 1,000 hunter-days
 - Lower quality of experience on auto tour route
 - Important for public to see
- Irrigations:
 - Zero irrigations in 1,100 acre unit
 - Reduced irrigations in 1,200 acre unit on east side
 - Results in marginal vs robust seed production
 - Lack of diversity
 - Ex: No watergrass



Kern NWR 2006 vs. 2008

- Irrigations:
 - Zero irrigations in 1,100 acre unit
 - Reduced irrigations in 1,200 acre unit on east side
 - Results in marginal vs robust seed production
 - Lack of diversity
 - No Watergrass, Ammania or Burhead - diving duck usage dropped the past two years



Kern NWR 2006 vs. 2008

- Lack of Spring and Summer Water
 - Drastically reduced broods (teal and mallard, redheads)...and those nests that survived not successful to fledging
 - No late spring shorebird habitat available
 - Tri-Colored Blackbird use down from peak of 21,000 in 2003 to **zero** in 2008





Kern NWR 2006 vs. 2008

- Great Blue Heron rookery nest peaked in 2005 at 53 nest, 19 in 2008
- Water quality impacts
 - No “flow-through” circulation flows in winter
 - recirculation of salts
 - detrimental to soil and vegetation

Kern NWR

- Recent impacts felt by Kern similar for most CVPIA refuges
- Critical to secure and deliver reliable, timely Full Level 4 supplies on an annual basis.

