Laguna Restoration Ambassadors Training
Fall 2015
Wildlife and the Laguna
Presentation by Denise Cadman

The following notes were taken during Denise's presentation and correspond with the PowerPoint file of the same name.

PRINCIPLE THEME: Everything is connected!

Ecosystems include a living community of organisms AND the abiotic (non-living) physical factors in their particular environment (temperature, soil structure, water availability, seasonal changes, etc)

- **Habitats** within the Laguna de Santa Rosa wetland complex
  - **Open water**
    - Where sunlight hits water, regardless of depth
    - Example of an open water food chain:
      ↓ Sunlight!→Unicellular algae (primary producers of food and oxygen)
      →Microscopic consumers→Invertebrates→Fish→Osprey, pelicans
  - **Riparian (**area that is the interface between land and a river or stream system)
    - Layers of vegetation:
      - Herbaceous base (grasses, sedges)
      - Shrubs at mid-level (blackberry, snowberry, wild rose, poison oak)
      - Trees at highest level (willow, hawthorne, Oregon ash, Box elder, valley oak)
  - **Freshwater marsh** (also called emergent wetland**)**
    - Characterized by clay soil that holds water with persisting emergent vegetation (plants that begin their life cycle under water and emerge above (think tules & cattails))
    - High productivity (lots of photosynthesis)
    - Organisms with adaptations (physical form or behavior that is heritable and gives advantage to living in a particular habitat)
      - Cattails
      - Tules
      - Marsh wren
      - Rails
      - Sora
  - **Grassland**
    - Native bunch grasses (well spaced to allow for other plants to cohabitate) have largely been replaced by non-native uniform annual grasses → decrease in wildflower displays
    - Oaks (black, coast live, valley) are keystone species, impact on ecosystem is disproportionate to their abundance
      - Provide abundant food resources (acorns, etc.)
      - Shelter & habitat for animals
      - Breeding habitat (nesting: birds, insects (galls) etc.)
      - Even decaying trees are habitat

- **Vernal pools**
  - Endemic species (those found nowhere else) (Geographically restricted to a specific area)
  - Historic distribution has decreased due to:
    - agricultural use of land (tilling breaks hard pan layer that traps water and erases depressions (swales) in landscape)
    - and development
  - Natural challenge of seasonal changes resulted in species adapted to live ONLY in vernal pools, dependent on dry/wet conditions for life cycle
    - Chorus frogs (can be more generalist)
    - CA Tiger salamander (critically endangered)

Overview of wildlife within the wetland complex

Keep in mind that some species cross between habitats. For example, cormorants, herons, and egrets inhabit in open water but nest in trees.

- **Resource partitioning**: Species use different parts of ecosystems. For example:
  - shore birds (differential beak and leg lengths to foster hunting at varying depths in the water or mud)
  - song birds (differential water dependence and seasonal patterns)
  - water fowl (surface consumer (dabbler) vs. divers)
  - riparian forest (layers of vegetation)
- Salmonids
  - Three species:
    - Steelhead trout (migrating rainbow trout), spawning grounds are all waterways, including Copeland Creek - THREATENED
    - Coho salmon (silver salmon), spawn in Mark West Creek only – ENDANGERED
    - Chinook salmon (king salmon), spawn in Santa Rosa Creek - THREATENED
  - Laguna is a migration corridor for all
  - Transport key nutrients from ocean to inland as part of their life cycle pattern – crucial ecosystem function!
- Predator populations are relatively healthy and increasing within Laguna ecosystems
  - Could be a good indicator that lower trophic levels are healthy
  - Could be due to availability of non-native prey (turkeys)
- Don't forget the ecological importance of decomposers!
- **Altogether, these organisms and habitats make an ecosystem habitable for humans.**

- Human Impacts:
    - Native Americans used gentler tools to impact the landscape to suit their needs (harvesting, regular cycles of fire) as evidenced by the "park-like" nature of the landscape described by arriving European settlers
    - European settlers cut trees for fuel, charcoal production, agricultural space
    - Biodiversity Crisis caused by:
        - Habitat loss and fragmentation
        - Introduced invasive species
            - Community level impacts: competition with and predation on native species
            - Ecosystem level impacts: decreased water table, interrupted nutrient cycles
            - Can lead to monoculture, reduced biodiversity
        - Pollution
            - Point source: (basically comes through a pipe)
                - Detectable, such as industry discharge
                - Largely controlled by legislation
            - Non-point source:
                - Difficult to trace and control (i.e. dairy or roadway runoff)
                - Can lead to eutrophication ("true growth," explosive growth of aquatic organisms/biomass, leading to bacterial population growth and ultimately oxygen poor aquatic environment → "dead zones")
            - We need:
                - Ways to absorb pollutants
                - Better practices to prevent pollution
- Intermediate Disturbance Hypothesis
    - Joe Connel, 1978: intermediate levels of habitat disturbance result in optimal levels of biodiversity (high levels discourages ecosystem development, low levels limits biodiversity through uninterrupted succession)
- Ongoing restoration efforts:
    - Alpha, Brown, Kelly, and Stone Farms
    - Gravenstein Creek riparian forest restoration (as mitigation for impacts of airport development on Poole Creek and associated wetland loss)
    - Studies needed:
        - Test designs of restoration projects
        - Discover sources of animal/plant declines (i.e. Western Pond Turtle)
        - Long-term monitoring to discover efficacy of restoration projects

Identification of species shown in slides:

Slide #	Species (clockwise beginning top left)
14	Northern Shoveler, American Wigeon, Mallards (dabbling for food), Northern Pintail
15	Common Merganser, Bufflehead, Ruddy Duck
16	Canada Goose
20	California Blackberry, Snow berry, CA rose, poison oak
21	Willow
22	Elderberry
23	Hawthorne
24	Oregon Ash
25	Box Elder
26	Valley Oak
27	Insects! Crane fly- many different types- lay eggs in wet soil/algae mats, dragonfly (damselflies too), ?, mosquito
28	Carp
29	Three-spined stickleback
30	CA roach
35	Western Pond Turtle
36	Wood duck (female), Hooded Merganser (female) Hooded Merganser (male) Wood duck (male)
37	Double-crested Cormorant
38	Great Egret
39	Black-necked Stilt, Western Sandpiper, American Avocet, Greater Yellowlegs, Killdeer
40	White-breasted Nuthatch, Chestnut-backed Chickadee, Common Yellowthroat, Brown Creeper, Warbling Vireo, Nuttall's Woodpecker, Ruby-crowned Kinglet
41 & 42	American Mink
43-46	River Otter
48-49	Freshwater Marsh (emergent wetland)
50	Cattail
51	Tule
52	Sora, Marsh Wren nest, Red-winged Blackbird, Marsh Wren
53	American Bittern
54-57	Vernal Pool
58	Sebastopol Meadowfoam, Sonoma Sunshine, Many-flowered Navarita, Burkes Goldfields
59	Chorus frog (technically the Sierran Tree Frog)
60	CA Tiger Salamander
65	Black Oak
66	Coast Live Oak
67-69	Valley Oak
70	Galls
71	Turkey Vulture
72	Townsend's Big Eared Bat, Red-tailed hawk, Oak Titmouse, Raccoon, Bullock's Oriole, Striped Skunk, Mountain Lion, Wood duck ducklings, Chorus Frog, Garter Snake, Caterpillar (generic), Ruby Crowned Kinglet

Identification of species shown in slides, continued:

73	Preying Mantis, Garden Spider (orb weaver), Grass Hopper, Monarch butterfly
74	Slender Salamander, Arboreal Salamander
75	Western Fence Lizard (aka: Blue-belly) Alligator Lizard
76	Sharp-tailed snake, Garter Snake, King snake, Gopher Snake,
77	Jack rabbit, Gray fox, River Otter, Raccoon, Black-tailed Deer, Long-tailed Weasel, Striped Skunk
78	Meadow Vole, Deer Mouse, Pocket Gopher
79	Jack rabbit, Black-tailed Deer
80	Raccoon, Opossum, Striped Skunk
81	Gray fox, Coyote, American Badger, Long-tailed Weasel, Bobcat
82	Mountain lion following deer (image caught on motion-detected camera set in the Mayacamas
83	Western Meadowlark, White-crowned Sparrow, Western Kingbird, Western Bluebird, California Quail, American Goldfinch
84	Western Kingbird, Black Phoebe, Say's Phoebe
85	Bullock's Oriole, Audubon's Warbler, Oak Titmouse, Nuttall's Woodpecker
86	Great Blue Heron
87	American Bald Eagle, Cooper's Hawk, Osprey, Red-tailed Hawk, White-tailed Kite
88	Bald Eagle adult & juvenile, (photo taken over the Laguna)
89	Decomposers!
100-101	Yellow Star Thistle (invasive)
102	Perennial Pepperweed (invasive)
103-104	Ludwigia (water primrose) (invasive)
120	Coyote bush