“A Citizen Science Approach to Tule Elk Herd Health and Rangeland Stewardship”

Jakob Larson: GIS Manager & Climate Change Analyst

To preserve the beauty and biodiversity of the earth and to provide programs so that children may know the wonder and joy of nature.

ESRI USER CONFERENCE
• Est. in 1995, (TWC) is dedicated to preserving the beauty and biodiversity of the earth and to providing programs so that children may know the wonder and joy of nature.

In working to achieve this mission, TWC has established the largest nonprofit nature preserve system in California, comprised of fifteen preserves encompassing 147,000+ acres of diverse mountain, valley, desert, river, and oceanfront landscapes. These preserves are open to the public free of charge for passive recreation, including camping, hiking, picnicking, birding, and more.

http://www.wildlandsconservancy.org/
Preserve System
GIS Managerial Tasks

- Threatened and endangered species
- Flora/fauna stewardship
- Restoration projects
- Trail maintenance/monitoring
- Preserve/reserve patrols
- Water use
- Climate analysis
- Remote sensing – UAS surveying
- Vegetation analysis (hurray for Living Atlas data!)
- Parcel sales and acquisitions
- Utility management
- Easement reports
- ...
Land Stewardship +
Outdoor Education +
Citizen Science

- Management Practices, Inventories, Monitoring, Analysis, Data Collection, Project Facilitation, and species counts... including projects like:
Annual (2017) Tule Elk Count
The Wildlands Conservancy’s Wind Wolves Preserve

At 93,000 acres, Wind Wolves is the west coast’s largest non-profit preserve
The Tule Elk

- Prior to the 19th century, early explorers estimated 500,000 tule elk in the central valley and central coast of California (California Department of Fish and Wildlife, CDFW, 2017) – by 1870 only a few remained.

- In 1998, The Wildlands Conservancy, in partnership with CDFW, coordinated an effort to restore populations at Wind Wolves Preserve - 19 elk introduced.

- Habitat improvements and rangeland enhancements such as wildlife troughs, riparian fencing, native plant restoration, rotational grazing management, and mineral blocks support the elk population and other native wildlife.

- To demonstrate the effectiveness of the introduction, herd health, and landscape improvements, TWC staff and volunteers conduct an annual tule elk count.
Previous Count Methods
Orientation: 2015 Wind Wolves Preserve Elk Count
September 5, 2015

The Wind Wolves Conservancy staff would like to thank you for your participation. We would not be able to have such a detailed count without your help. The majestic Tule Elk were once extirpated from these lands, but now you face. We will use the information collected today for future management decisions to continue to help keep the Tule Elk population growing and thriving on the preserve. Future generations will continue to experience watching a herd of elk pass before them on this grand landscape and we thank you for contributing to their survival.

Safety
- Keep hydrated: bring a hat, sunscreen, and enough water to drink 1 cup every 30 minutes
- Watch for Plateaus and Ticks
- Drive cautiously on mountain roads, use 4wd vehicles on mountain roads
- Maintain communication
  - Radio: Channel 1. Push and hold talk button, wait a moment, and then speak. If radio doesn’t give you backackonata after you are done talking, then you didn’t hit the repeat.

Count Techniques
- Only count while on your designated site
- Count the total number of a group first. Then count calves, bulls, et al.
- Take digital photos with time and date stamp if possible.
- Count for Fawns
  - Adult Sheep & Trailing: count number of cows, bulls, and calves
  - The Matching: record one tag color and number (only if 100% confirmed)
- Counting new calfs: several new calves have orange color, please make special note of sex and age

Recounting Data
- Use a block of data sheet (1/2 page) for each observation of elk.
- Mark your observation on your map, with a number at the animal’s location when first observed.
- Draw an arrow for direction of travel if they move off.
- Fill out information for bold forms on the data sheet.
- Turn in ALL data sheets, maps, notes, and GPS if borrowed.

Phone Numbers:
- Office: 661-436-1153
- Louie’s Cell: 609-767-0148
- Megan’s Cell: 661-319-5899
- Ahrne’s Cell: 661-900-3987

In 2014, we counted a total of 355 elk:
- 215 adults
- 41 sub-adults
- 35 spike/bull calves
- 65 brat/bull calves

Mature Bull
Big Horn Bull
Mittlen Zebra
Cows and calves - Robert Stuemke
## WWP Elk Count Data Sheet

<table>
<thead>
<tr>
<th>Date:</th>
<th>Time:</th>
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<tbody>
<tr>
<td>Observers:</td>
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<tr>
<td>Key to Map #</td>
<td>General Location</td>
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<td>Total # in group</td>
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<td># of Adult Cows</td>
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<td># of Adult Bulls</td>
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<td># of Calves</td>
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<td>Total # of Bulls:</td>
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<td># Spike Bulls</td>
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<td># of Branch Bulls</td>
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<td>Comments:</td>
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## Tule Elk Survey Form

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<td>Conditions:</td>
<td>End Time:</td>
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<td>Observers:</td>
<td>Route Name:</td>
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### Field Notes

<table>
<thead>
<tr>
<th>ID#</th>
<th>EHP Peak or Map #</th>
<th>Group Size</th>
<th>Spike</th>
<th>Bogge</th>
<th>Adult</th>
<th>Unknown</th>
<th>Coat</th>
<th>Habitat</th>
<th>Behavior</th>
<th>Notes: tag color, tag number, collar, and photo number</th>
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On September 16th, 2017, 32 participants assisted with the 15th Annual Tule Elk Count.
Tule Elk - Collector Application
Tule Elk Collector Application - Visualization
Elk Count - Results
Results - Continued

- Total Elk 276 (additional 56 counted from neighboring property)
- 1 Bull : 3.91 Cows
- Cow : Calf Ratio = 0.24 or 24% recruitment
- Observed over 250 elk since 2013 (Figure 1). A strong linear regression (R2 = 0.7918) indicates that, on average, 15 elk are added to the WWP herd every year (Figure 2)
Future Elk Count Operations

• Collect years’ past hand written/colllected observations and transcribe them into GIS layers
• Continue to build upon the yearly data archive
• Utilize data to predict behaviors, observe trends, and enhance monitoring
• Conduct aerial monitoring during future counts with drones
• Implementation of Esri “Sites” applications for data display
• Use of Living Atlas layers to further promote and enhance studies
• Open sourced data applications for elk sightings
The Wind Wolves Rangeland Vision
Thank You
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(909) 797-8507
• Photo credits to: John Trammell, Aaron Collier, Melissa Dabulamanzi and Jakob P. Larson


