DFG Wildlife Action Plan Climate Work Group Meeting
March 3, 2012

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Climate Science and Renewable Energy Branch
Agenda

- Introductions
- Work group purpose/objectives
- Overview of SWAP (Armand)
- Survey results
- Potential work group tasks
- Next steps
Work group purpose/objectives

- Provide stakeholder input and support to thoroughly integrate climate change into California’s State Wildlife Action Plan (SWAP) revision process.

Objectives:
- Provide information for DFG teams to adequately consider climate change issues
- Identify a network of partners with climate expertise that can work with DFG teams
- Ensure climate change is effectively and appropriately integrated into the SWAP
SWAP

- Completed in 2005
- FWS requires updates every 10 years
- Position CA/DFG to integrate new information and leverage more funding
- Overarching vision for natural resources
- Articulate strategy for:
  - Priority species and habitats
  - Identify data gaps, research and monitoring needs
  - Recommendations and accountability
Elements 1-4

1. Information on the distribution and abundance of wildlife, including low and declining populations, that describes the diversity and health of the state’s wildlife.

2. Descriptions of locations and relative conditions of habitats essential to species in need of conservation.

3. Descriptions of problems that may adversely affect species or their habitats, and priority research and survey efforts.

4. Descriptions of conservation actions proposed to conserve the identified species and habitats.
5. **Plans for monitoring species and habitats**, and plans for monitoring the effectiveness of the conservation actions and for adapting these conservation actions to respond to new information.

6. Descriptions of procedures to **review the plan** at intervals not to exceed 10 years.

7. **Coordination** with federal, state, and local agencies and Indian tribes in developing and implementing the wildlife action plan.

8. **Broad public participation** in developing and implementing the wildlife action plan.
California SWG Funding History
(millions)

<table>
<thead>
<tr>
<th>Year</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>$2.425</td>
</tr>
<tr>
<td>2002</td>
<td>$3.880</td>
</tr>
<tr>
<td>2003</td>
<td>$2.883</td>
</tr>
<tr>
<td>2004</td>
<td>$3.060</td>
</tr>
<tr>
<td>2005</td>
<td>$1.267</td>
</tr>
<tr>
<td>2006</td>
<td>$2.977</td>
</tr>
<tr>
<td>2007</td>
<td>$2.977</td>
</tr>
<tr>
<td>2008</td>
<td>$3.025</td>
</tr>
<tr>
<td>2009</td>
<td>$3.002</td>
</tr>
<tr>
<td>2010</td>
<td>$3.703</td>
</tr>
<tr>
<td>Total</td>
<td>$29.203</td>
</tr>
</tbody>
</table>

- SWG funding range $2.4 million to $3.7 million
- Based on formula (land base x population)
- Other funding opportunities
Update objectives

- Create the vision for fish and wildlife conservation in California
- Provide an accounting of accomplishments
- Stratify analysis of impacts and stressors by ecoregions
- Incorporate climate change impacts and adaptation strategies
- Update species at risk, vulnerable species and species of greatest conservation need
- Recommend conservation actions consistent with planning documents developed by other agencies
## Update Components

### Internal Coordination
- Executive Committee
- Steering Committee
- Technical Team

### Administrative
- Grants and Contracts
- Training

### Public Outreach
- Social Media
- Advisory Committees
  - Tribal
  - Public
    - Agriculture
    - Forests
    - Water
    - Consumptive Users
- State Agencies
- Federal Partners
- Scoping
- Draft Review

### Data Development
- Range maps
- Species Data-Base
- Species at Risk-Target Species
- Vulnerability Study
- List of Stressors/Threats

### Strategy Development
- Open Standards
  - Goals and Actions
  - Effectiveness Measures
  - Monitoring Plan
  - Adaptive Management Strategy
- Heinz Center/BLM
Phase I

- Public Outreach
- Internal Scoping
- Public Scoping
- Facilitation
- Data Development
- Vulnerability Analysis
**CA SWAP UPDATE PROCESS**

- **Assess Species** by exposure and adaptive capacity
  - Interactions

- **Establish Targets**
  - Key species and habitat by ecoregion

- **Conduct Situation Analysis** habitats by ecoregion
  - Threats (including climate change impacts)
  - Drivers of threats (including alterations in climate conditions)
  - Human effects

- **Conduct viability** (climate vulnerability) assessments for habitats by ecoregion
  - Key ecological attributes (KEAs): size, condition, landscape context of habitat (including spatial analysis)
  - Indicators: desired status/future condition of targets based on KEAs

- **Define goals for species and habitats by ecoregion** (based on indicators)

- **Refine Areas using Areas of Conservation Emphasis; Habitat Corridors** by ecoregion and statewide

- **Define Actions**
  - Prioritize based on criteria (cost, benefit, feasibility, confidence)

- **Refine Areas using Areas of Conservation Emphasis; Habitat Corridors** by ecoregion and statewide

- **Develop Effectiveness Measures and Metrics** (outcomes towards goals by ecoregion)

- **Roll-up actions and measures state-wide**

- **Monitoring and adaptive management**

- **Produce Report**

- **Assess threats by severity, scope and irreversibility**
Phase II

- Compile Ecoregional Assessments
- Update Maps
- Conduct External Coordination
- Publish Drafts and Final Report
- Conduct Public Review and Response to Comments
- Final Roll-out
Stakeholder Committee Roles

- Provide input on ecoregion targets
- Provide expertise to ecoregional teams
- Review ecoregional strategies
- Participate in public scoping meetings
- Review climate chapter
- Provide scientific advice throughout process i.e. Response to comments, companion plans.
Survey Results

- Number of participants: 8
- California climate change literature: 16

Regional climate contacts
- Klamath-Cascade-Sierra: 5
- Coast-Marine: 9
- Central Valley and Coast Range: 6
- California Deserts: 5
- All: 2

Regional climate change literature
- Klamath-Cascade-Sierra: 17
- Coast-Marine: 27
- Central Valley and Coast Range: 0
- California Deserts: 1
Climate Factor Worksheet

Ecoregion: Northern California Coast (coastal portion of PRBO Northwestern California Ecoregion and some info taken from the Central Western California Ecoregion)

<table>
<thead>
<tr>
<th>General stress, abiotic, ecosystem-level (Geyer et al. 2010)</th>
<th>Climate Factor/Projected abiotic change</th>
<th>Direction (+/-)</th>
<th>Magnitude (or range)</th>
<th>Source(s)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1.1 climatic changes (average, variability, seasonality)</td>
<td>Δ annual average temperatures</td>
<td>+</td>
<td>increase 1.7 to 1.9°C by 2070</td>
<td>Cayan et al. 2008</td>
<td></td>
</tr>
<tr>
<td>3.1.1 climatic changes (average, variability, seasonality)</td>
<td>Δ spring average temperature</td>
<td>+</td>
<td>1.1 to 3.4°C from 2035-2069</td>
<td>Cayan et al. 2008</td>
<td></td>
</tr>
<tr>
<td>3.1.1 climatic changes (average, variability, seasonality)</td>
<td>Δ summer average temperature</td>
<td>+</td>
<td>0.9 to 2.4°C from 2035-2069</td>
<td>Cayan et al. 2008</td>
<td></td>
</tr>
<tr>
<td>3.1.1 climatic changes (average, variability, seasonality)</td>
<td>Δ winter average temperature</td>
<td>+</td>
<td>Mean max. and min. tem</td>
<td>Bell et al. 2004</td>
<td></td>
</tr>
<tr>
<td>3.1.1 climatic changes (average, variability, seasonality)</td>
<td>Δ temperature extremes</td>
<td>+</td>
<td>Many of these</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1.1 climatic changes (average, variability, seasonality)</td>
<td>Δ average length of frost free growing season</td>
<td>+</td>
<td>begin 25 days earlier and Bell et al. 2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1.1 climatic changes (average, variability, seasonality)</td>
<td>Δ annual average precipitation</td>
<td>-</td>
<td>10.1 to 387 mm by 2070</td>
<td>PRBO report</td>
<td></td>
</tr>
<tr>
<td>3.1.1 climatic changes (average, variability, seasonality)</td>
<td>Δ spring average precipitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1.1 climatic changes (average, variability, seasonality)</td>
<td>Δ summer average precipitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1.1 climatic changes (average, variability, seasonality)</td>
<td>Δ fall average precipitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1.1 climatic changes (average, variability, seasonality)</td>
<td>Δ average winter precipitation</td>
<td>-</td>
<td>+13 to -92 statewide by Hayhoe et al. 2003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1.1 climatic changes (average, variability, seasonality)</td>
<td>Δ form of precipitation (from snow to rain)</td>
<td>n/a</td>
<td>shift from snow to rain</td>
<td>Cayan et al. 2008</td>
<td></td>
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<tr>
<td>3.1.2 change in marine water characteristics</td>
<td>Δ in currents and upwelling</td>
<td>+</td>
<td>intensifying upwelling</td>
<td>Synder et al. 2004</td>
<td></td>
</tr>
<tr>
<td>3.1.3 change in freshwater hydrologic regimes</td>
<td>Δ water temperature</td>
<td>+/-</td>
<td>no info</td>
<td>PRBO report</td>
<td></td>
</tr>
<tr>
<td>3.1.3 change in freshwater hydrologic regimes</td>
<td>Δ runoff and river flow (annual)</td>
<td>-</td>
<td>loss of snowpack in PRBO</td>
<td>Stewart et al.</td>
<td></td>
</tr>
<tr>
<td>3.1.3 change in freshwater hydrologic regimes</td>
<td>Δ timing of runoff</td>
<td>n/a</td>
<td>shift in timing of heavy</td>
<td>Stewart et al.</td>
<td></td>
</tr>
<tr>
<td>3.1.3 change in freshwater hydrologic regimes</td>
<td>Δ groundwater table</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1.3 change in freshwater hydrologic regimes</td>
<td>Δ water chemistry (freshwater)</td>
<td></td>
<td>salinity intrusion into</td>
<td>PRBO</td>
<td></td>
</tr>
<tr>
<td>3.1.5 change in freshwater hydrologic regimes</td>
<td>Δ flood occurrence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1.4 change in snow or ice regimes</td>
<td>Δ snow pack</td>
<td>-</td>
<td>73% reduction in snow</td>
<td>Snyder et al. 2004</td>
<td></td>
</tr>
<tr>
<td>3.1.4 change in snow or ice regimes</td>
<td>Δ snow cover period</td>
<td>-</td>
<td>shorter period due to</td>
<td>Kiparsky and Gile</td>
<td></td>
</tr>
<tr>
<td>3.2.1 change in abiotic structure</td>
<td>SLR (average)</td>
<td>+</td>
<td>6-32 cm above 1990 level</td>
<td>Cayan et al. 2008</td>
<td></td>
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<tr>
<td>3.2.1 change in abiotic structure</td>
<td>SLR (extremes)</td>
<td>+</td>
<td>frequency of sea level</td>
<td>increases in the</td>
<td></td>
</tr>
</tbody>
</table>
Work Group Tasks

April Tasks:
- Identify state-wide and regional California climate change literature references
- Identify regional climate change contacts
- Climate factors worksheet

May-August Tasks:
- Review and finalize climate change overarching chapter for the SWAP
- Review and provide input on ecoregional teams climate strategies.
- Serve as a resource to DFG ecoregional teams on climate change
Next Steps

- Next meeting 2-3 weeks?
- Finalize survey response
  - Review compiled survey document
  - Add additional regional contacts
  - Populate deserts, central valley-coast ranges resources
- Discuss climate factors worksheets