



## Regional Water Supply and Climate Impacts: a Review of Community Adaptation Strategies



Climate Change and the Future of Food

Bellingham, WA

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Climate Impacts Research Consortium



## Outline

1. Background: CIRC, Extension and Adaptation
2. Review of Projected Impacts
3. State Climate Adaptation Strategies
4. Identifying Community Vulnerabilities

# Pacific Northwest Climate Impacts Research Consortium

*Supporting landscape and watershed management in a changing climate*



## Background

Climate Impacts Research Consortium

Regional Extension Services





## What is Adaptation?

- Adjusting to a new set of circumstances... i.e. climate attributes such as *temperature, precipitation* and responses from things (*forests, waters, fish...*) we care about

## Types:

- *Autonomous*: Rely on existing framework and policies to respond to changes as they arrive.... *Take it as it comes.*

- *Planned*: Traditional planning in the context of anticipated climate changes.... *What do we need to do differently to accommodate the future?*





## Background

### Ability to Adapt?

- We seem capable in short-term (Hamlet 2010)
- Will long term changes be outside our capacity?





## Preparing for Climate Change:

## Washington State Integrated Climate Change Response Strategy

### Possible Strategies

- 1. Integrated water resources management.
- 2. Declining snowpack and natural water storage  
**2. Implement water conservation and efficiency programs**
- 3. Improve water supply & quality in priority basins  
(earlier peak flows)
- 4. Higher flood risk  
**4. Build capacity**



Preparing for a Changing Climate

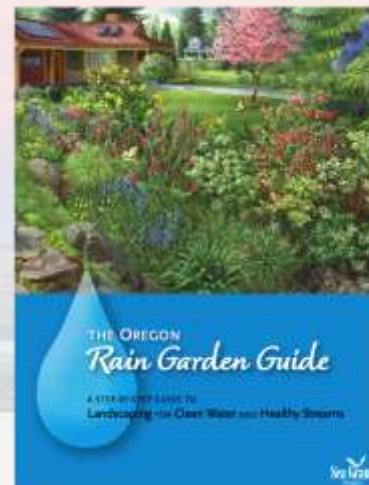
Washington State's Integrated Climate Response Strategy



## 2. Implement water conservation and efficiency programs

### Municipal and Residential:

- Water-smart landscaping
  - Water-efficient irrigation systems
  - Rainwater harvesting from roofs
- Water-efficient development **codes** and **policies** for new developments
  - **Rebates** to install or upgrade
  - **Regulations** to reduce waste of water used outdoors
  - **Education** and public outreach campaigns







## 2. Implement water conservation and efficiency programs

### Agriculture: Infrastructure Improvements

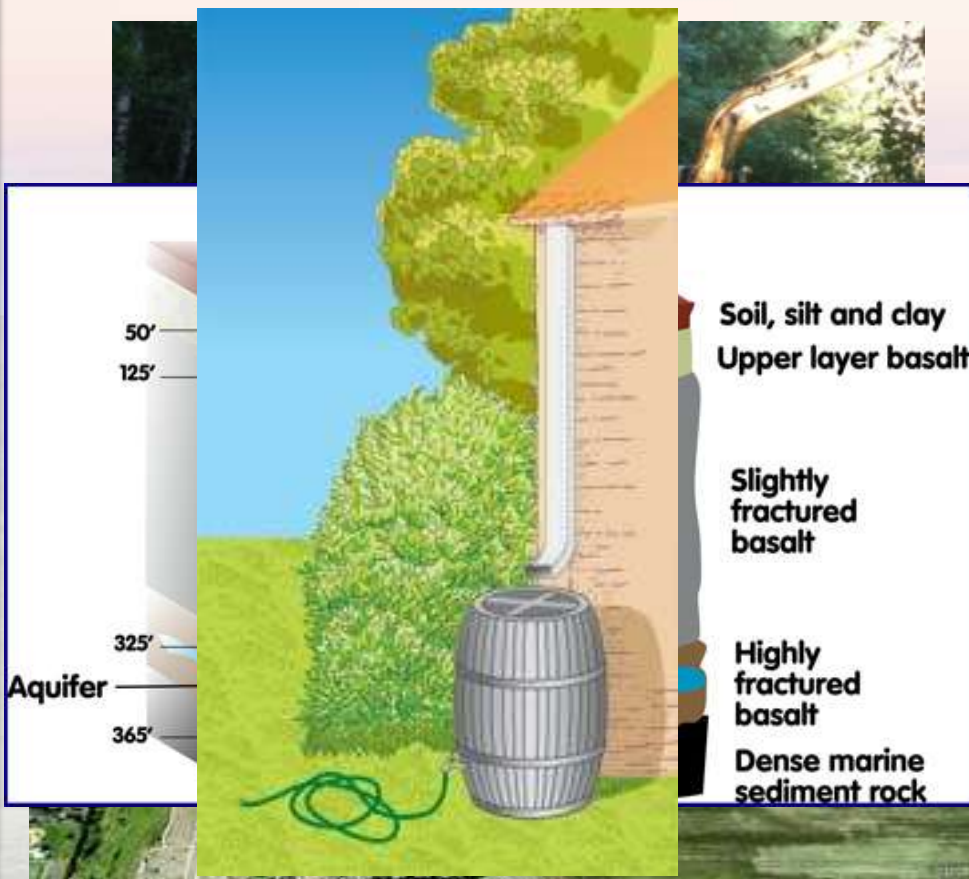
- Lining ditches
- Piping
- On-Farm conservation
- Pump exchange  
(replacing water from one source with water from another)







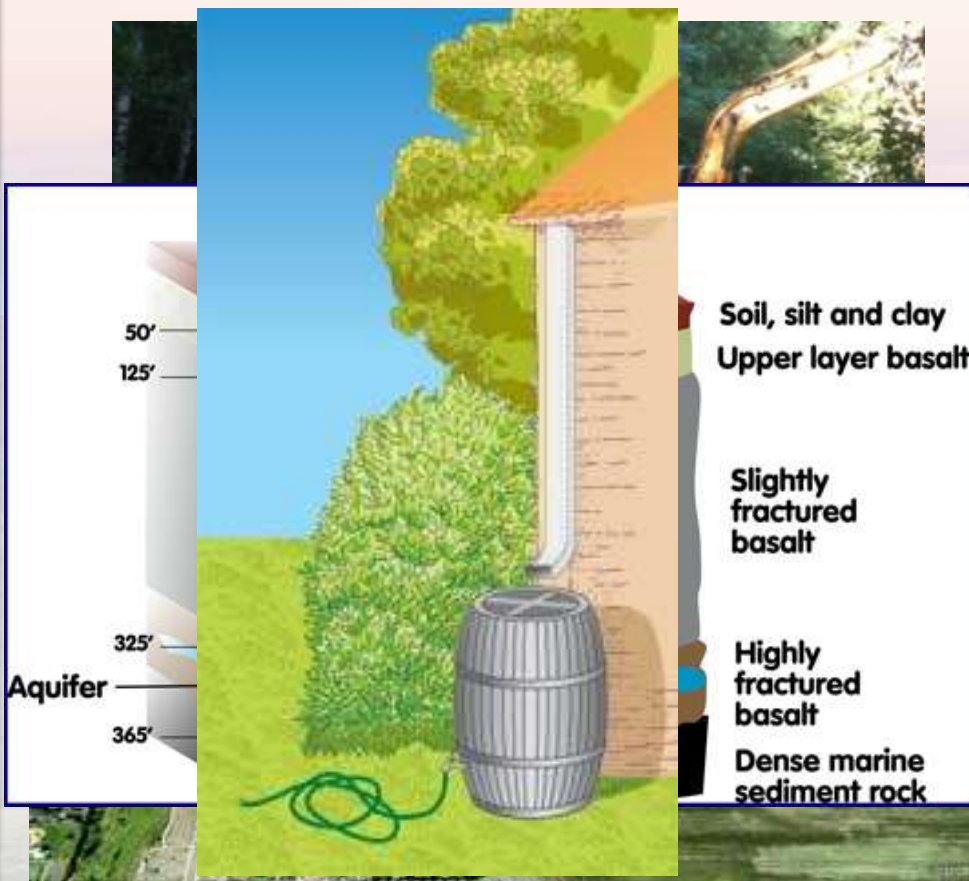
## 3. Improve water supply & quality in priority basins



- Direct development away from vulnerable areas
- Work with Fed and State partners to improve forest management practices to improve water holding capacity
- Expand protection of agricultural and forest lands and aquifer storage areas
- Support new surface and aquifer storage
- Conserve water (drought tolerant landscaping, retain graywater and stormwater onsite).



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## **Toward a Resilient Watershed**

*Addressing Climate Change Planning  
in Watershed Assessments*

The Resource Innovation Group  
January 2012

## **Watershed Assessment & Climate Planning**

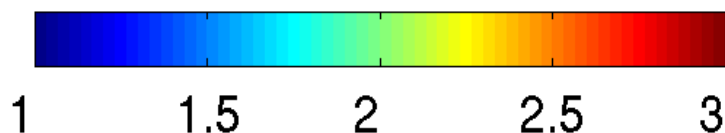
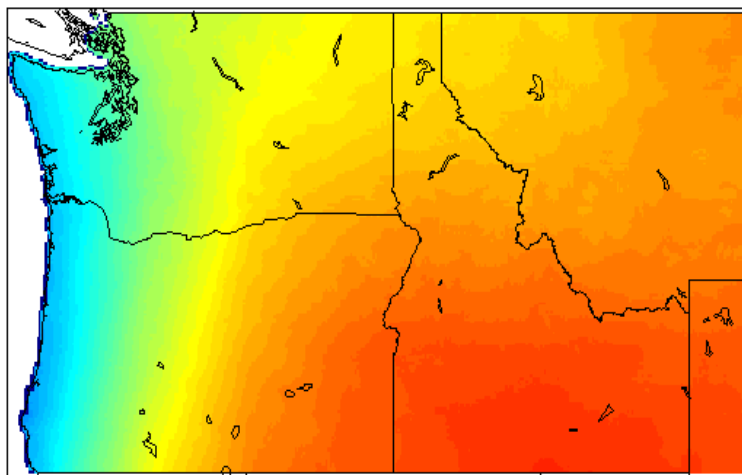
1. Gather future climate scenarios
2. Assess vulnerability
3. Consider other impacts
4. Identify opportunities
5. Assess Risks
6. Consider climate risks among all risks
7. Determine priority climate risks
8. Write it up





## Watershed Assessment & Climate Planning

$\Delta T$  ( $^{\circ}\text{C}$ ), May-Oct  
CSIRO-MK3.6 RCP45 2025-2049 minus 1950-2005



1. Gather future climate scenarios

### New PNW Climate Scenarios

- *Downscaled to 4-km using gridded meteorological data of Abatzoglou (2012)*
- [nimbus.cos.uidaho.edu/abat/c mip5](http://nimbus.cos.uidaho.edu/abat/c mip5)



## Watershed Assessment & Climate Planning

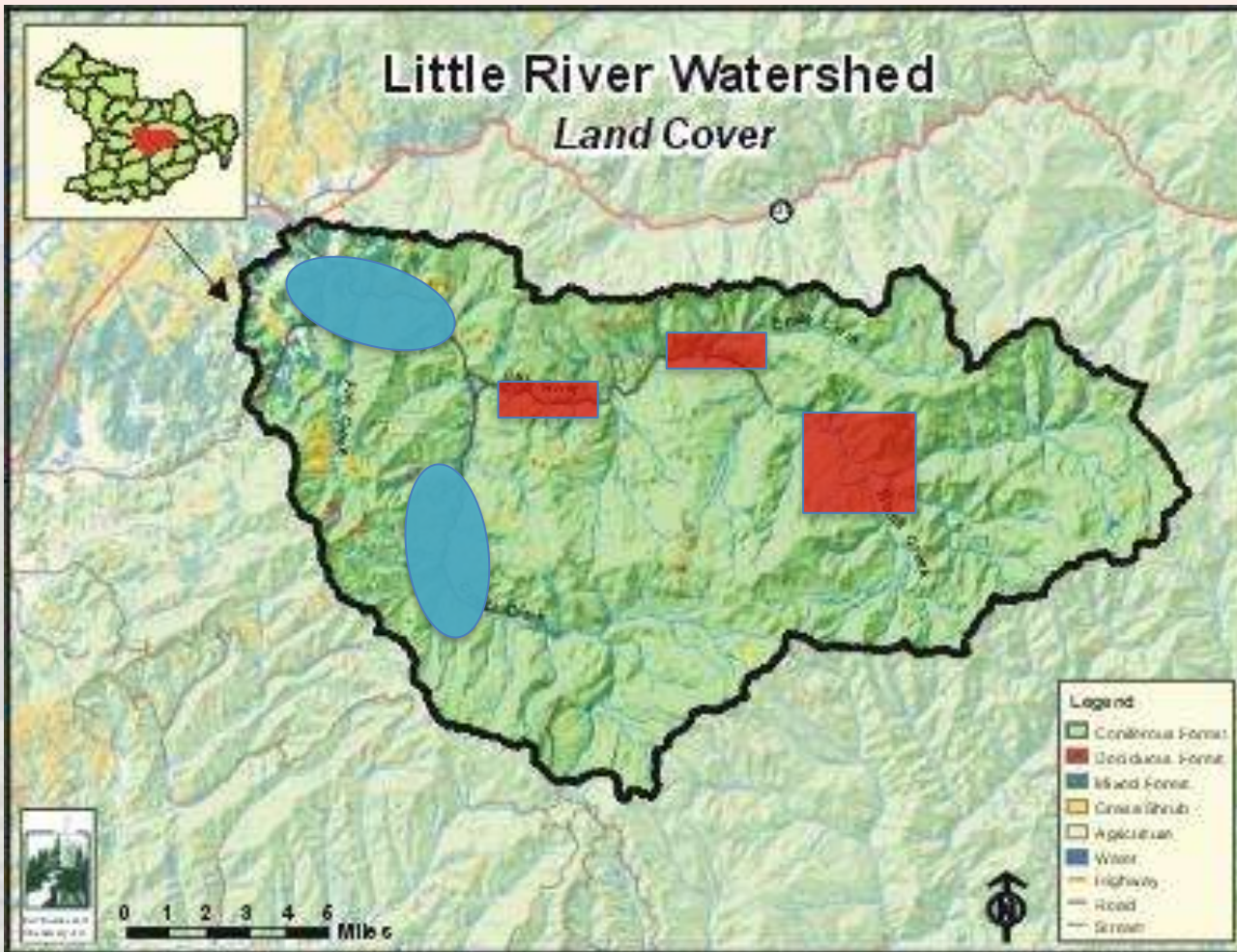
### 2. Assess vulnerability

#### Examples:

- *Stream temperature*



- *Flooding*







## Watershed Assessment & Climate Planning

### 3. Indirect Impacts?

#### Examples:

- Increased ET and crop water demands





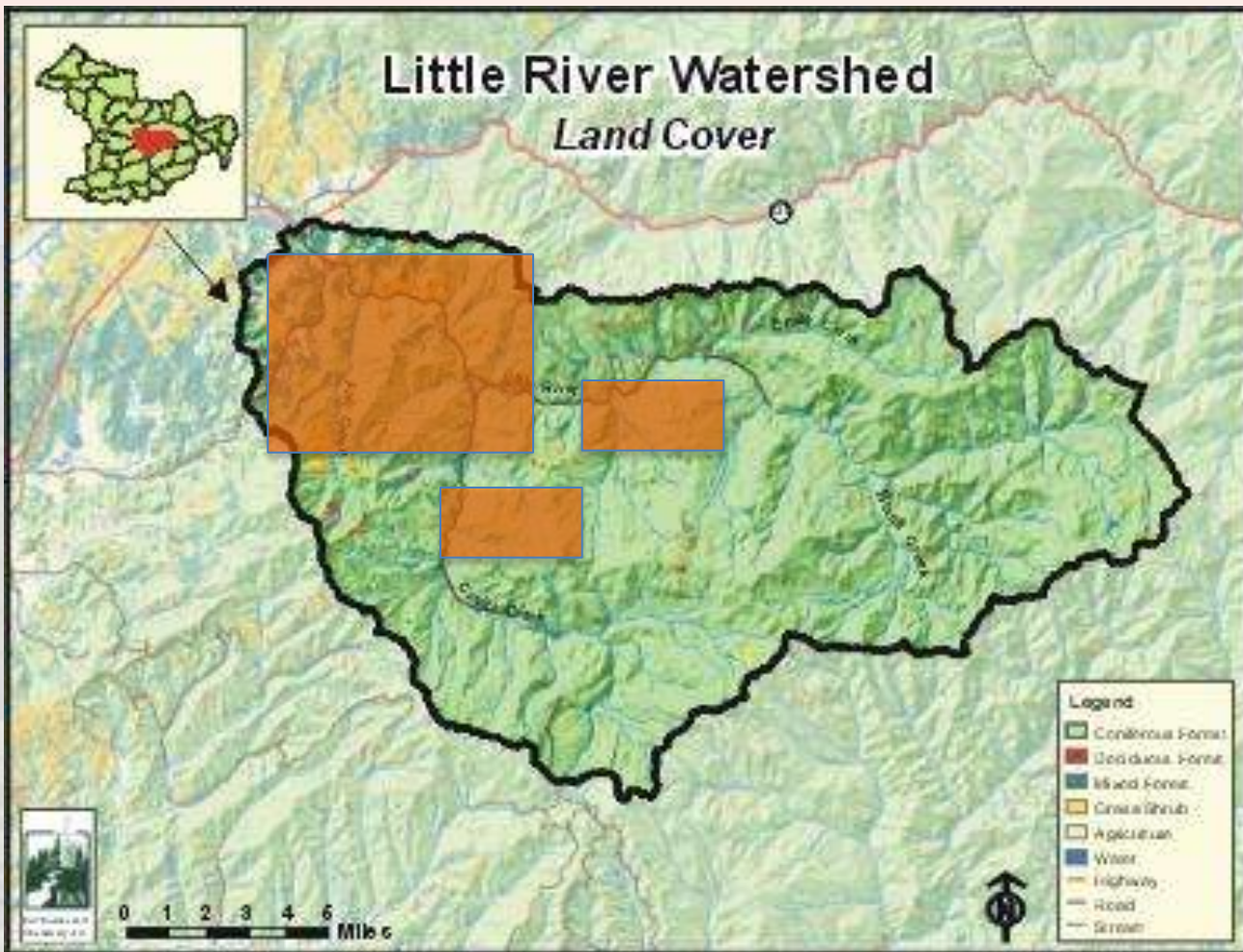


## Watershed Assessment & Climate Planning

### 4. Opportunities?

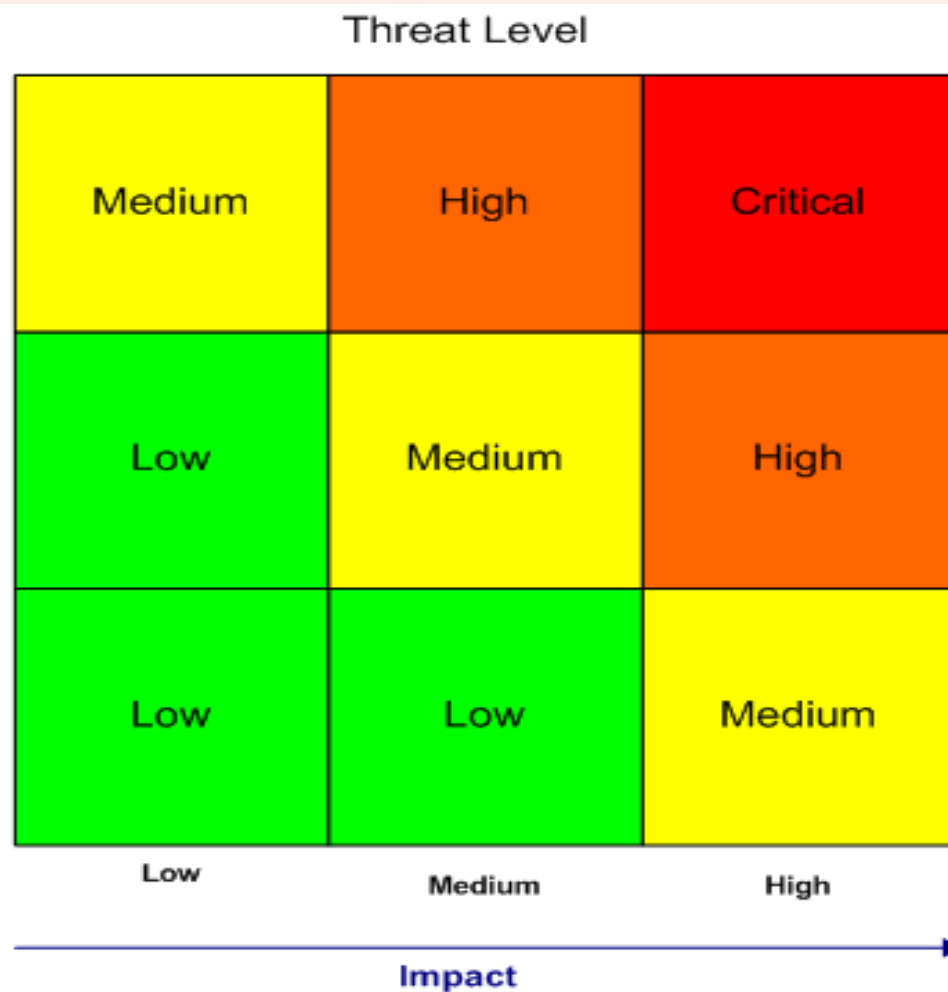
Examples:

- *Longer growing season?*
- *New crop varieties?*





## Watershed Assessment & Climate Planning



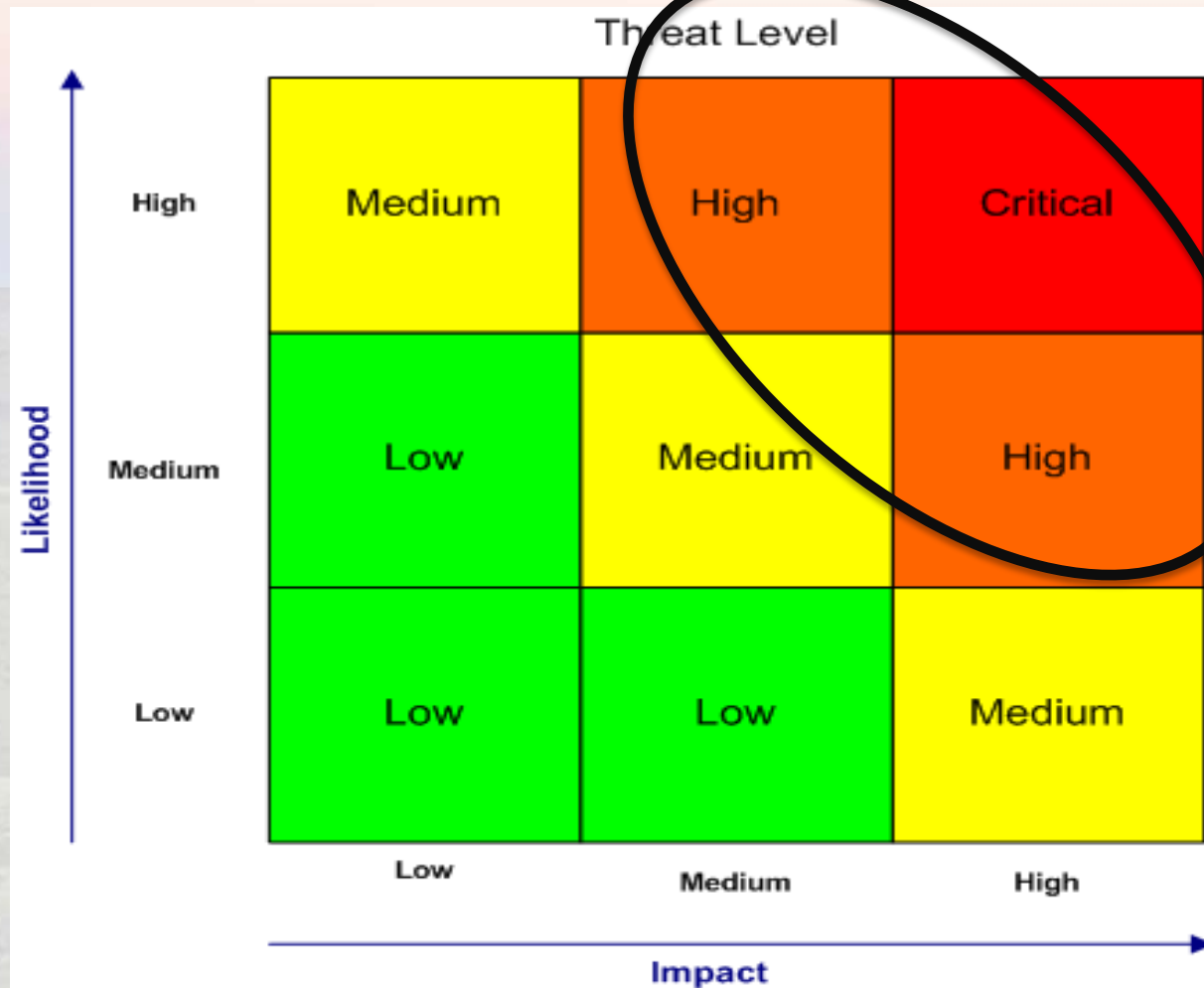
### 5. Assess Risks

- Risk = Likelihood x Consequence





## Watershed Assessment & Climate Planning



### Prioritize Risks

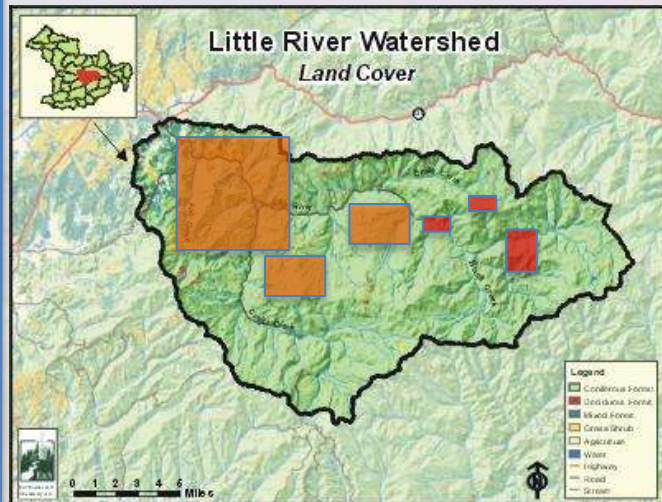
Considerations:


- *Risks already faced*
- *Likely increase rapidly under climate change*
- *Co-benefits (other advantages besides climate impact avoidance)*





## Watershed Assessment & Climate Planning



- 
- *Stream temp*
  - *Flood frequency*
  - *Crop demand*

- Direct development away from vulnerable areas
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## Summary

1. Facing range of possible hydrologic impacts
2. Evidence that adaptation will be most important in longrun
3. Appropriate adaptation strategies depend on specific impacts to you area
4. Assessment can be done through community process relying on existing data



## More Information

### Upcoming Webinars:

- **Oct 30, 2012, 10-12am** *Projected Climate Scenarios for the Pacific Northwest based on the Latest Generation of Global Climate Modeling.* Email [jstevenson@coas.oregonstate.edu](mailto:jstevenson@coas.oregonstate.edu) for information
- **Nov 14, 2012 11-12pm:** *Robust Decision Making – Carpe Diem West,*. Email [maria@carpediemwest.org](mailto:maria@carpediemwest.org)

### Cited Documents:

- *Washington State Integrated Climate Change Response Strategy*  
[http://www.ecy.wa.gov/climatechange/ipa\\_responsestrategy.htm](http://www.ecy.wa.gov/climatechange/ipa_responsestrategy.htm)
- *Toward a Climate Resilient Watershed: Addressing Climate Change Planning in Watershed Assessments -The Resource Innovation*  
<http://www.theresourceinnovationgroup.org/climate-preparedness-pubs/>