

WELCOME!
READY FOR CHANGE:
PREPARING OREGON'S PUBLIC
HEALTH AND EMERGENCY
MANAGEMENT SECTORS



CLIMATE CHANGE CAUSES & EFFECTS: CONSEQUENCES FOR PUBLIC HEALTH AND EMERGENCY PREPAREDNESS

Stacy Vynne (Climate Leadership Initiative)

Michael Heumann (Oregon Health Authority)

Ready for Change * Spring 2011

Considerations for Today



- What threats does climate change pose towards public health and social services globally, nationally, locally?
- How do you fit in? What impacts and resulting consequences will you be dealing with in your community and line of work?
- What actions are we already taking? What barriers are we facing?
- Considering the projected impacts, how will the tools, resources, and communication strategies you learn about today be applied in your community?



Greenhouse Effect?

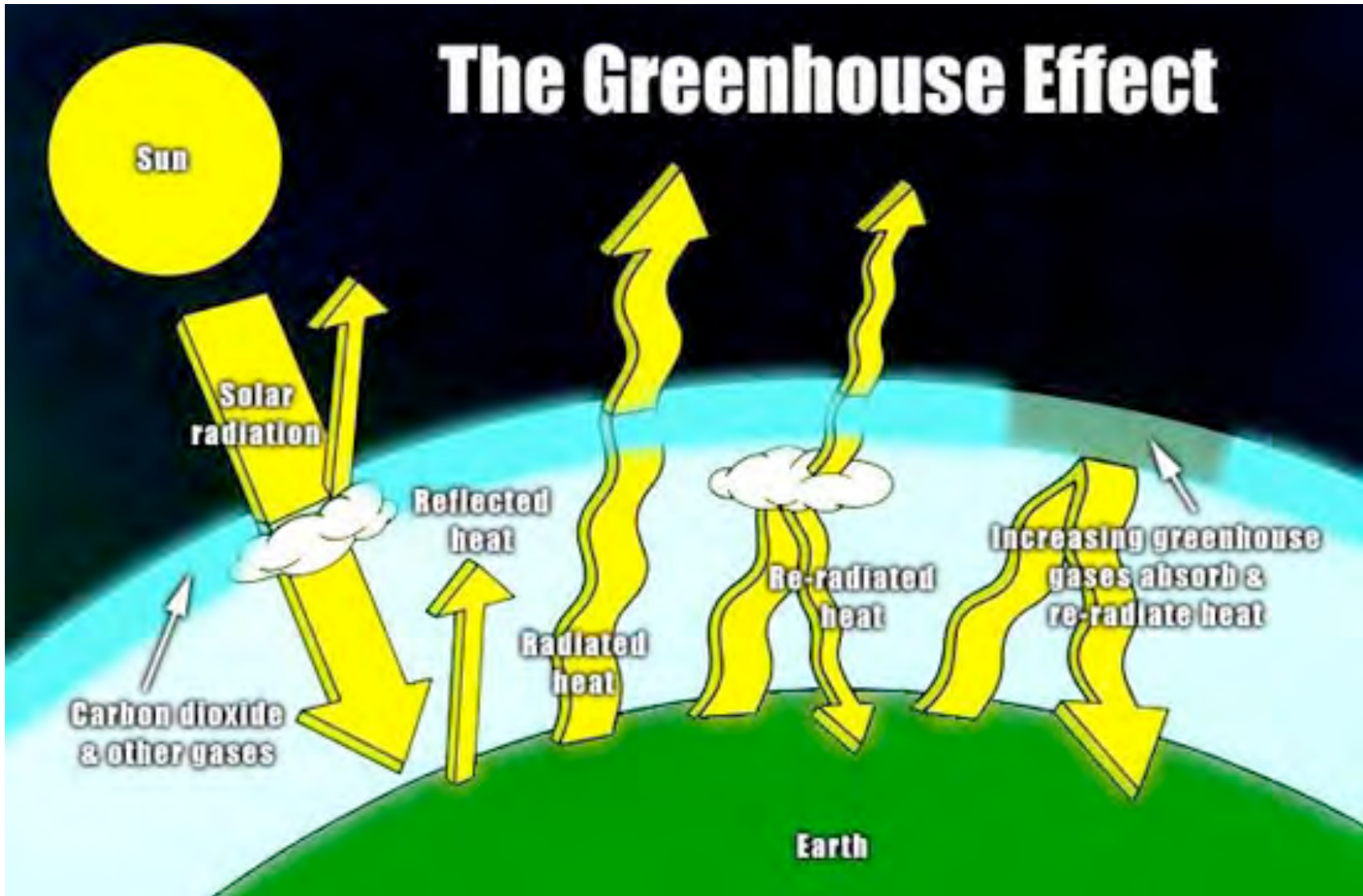
Weather?

Climate Change?

Global Warming?



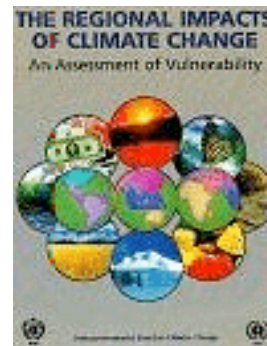
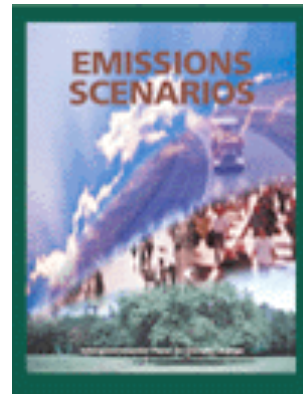
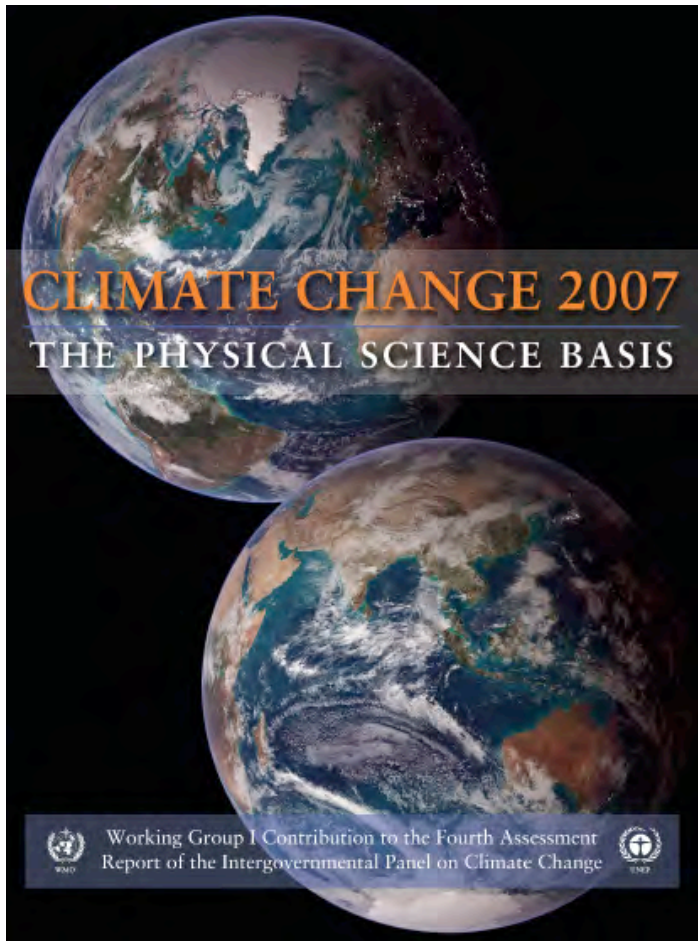
The Greenhouse Effect







Intergovernmental Panel on Climate Change (IPCC)



Climate Change 2007:
Synthesis Report

Summary for Policymakers

An Assessment of the Intergovernmental Panel on Climate Change

This summary, approved in detail at IPCC Plenary XXVII (Valencia, Spain, 12-17 November 2007), represents the formally agreed statement of the IPCC concerning key findings and uncertainties contained in the Working Group contributions to the Fourth Assessment Report.

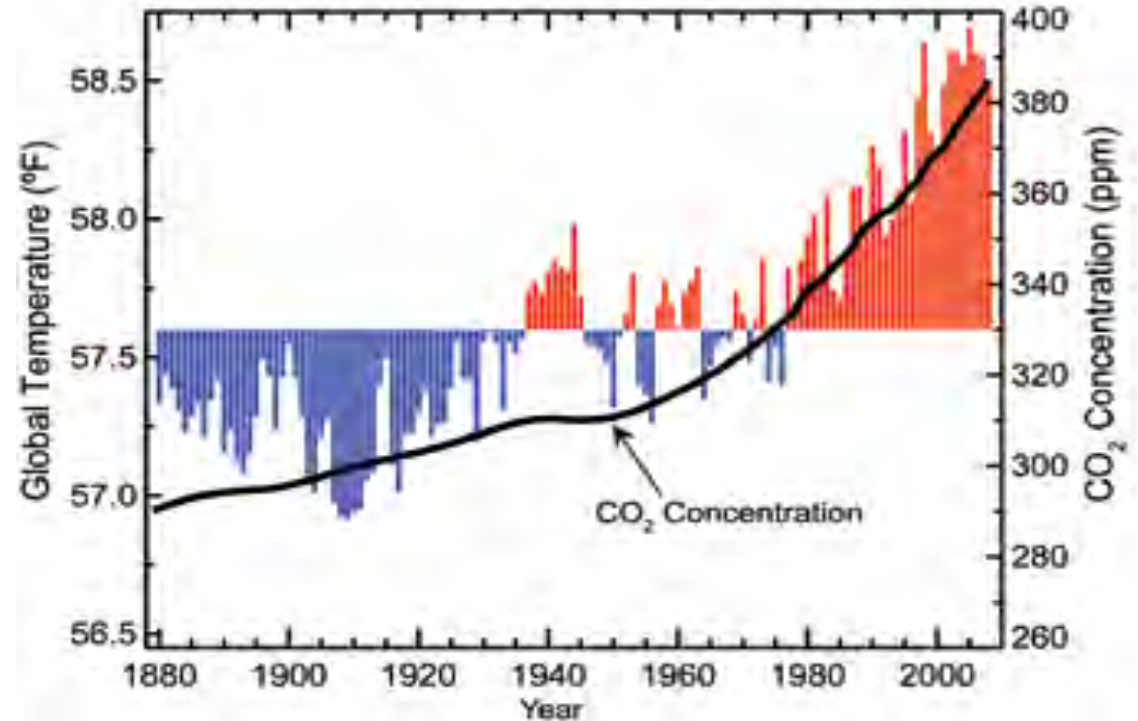
Based on a draft prepared by:

Lenny Bernstein, Peter Bosch, Osvaldo Canziani, Zhenlin Chen, Renate Christ, Ogunlade Davidson, William Hare, Saleemul Huq, David Karoly, Vladimir Kattsov, Zbigniew Kundzewicz, Jian Liu, Ulrike Lohmann, Martin Manning, Taro Matsuno, Bettina Menne, Bert Metz, Monirul Mirza, Neville Nicholls, Leonard Nurse, Rajendra Pachauri, Jean Palutikof, Martin Parry, Dahe Qin, Njavalli Ravindranath, Andy Reisinger, Jiawan Ren, Keywan Riahi, Cynthia Rosenzweig, Matilde Rusticucci, Stephen Schneider, Youba Sokona, Susan Solomon, Peter Stott, Ronald Strouffer, Taisshi Sugiyama, Rob Swart, Dennis Tirpak, Coleen Vogel, Gary Yohe

www.ipcc.ch

Climate Change is Happening

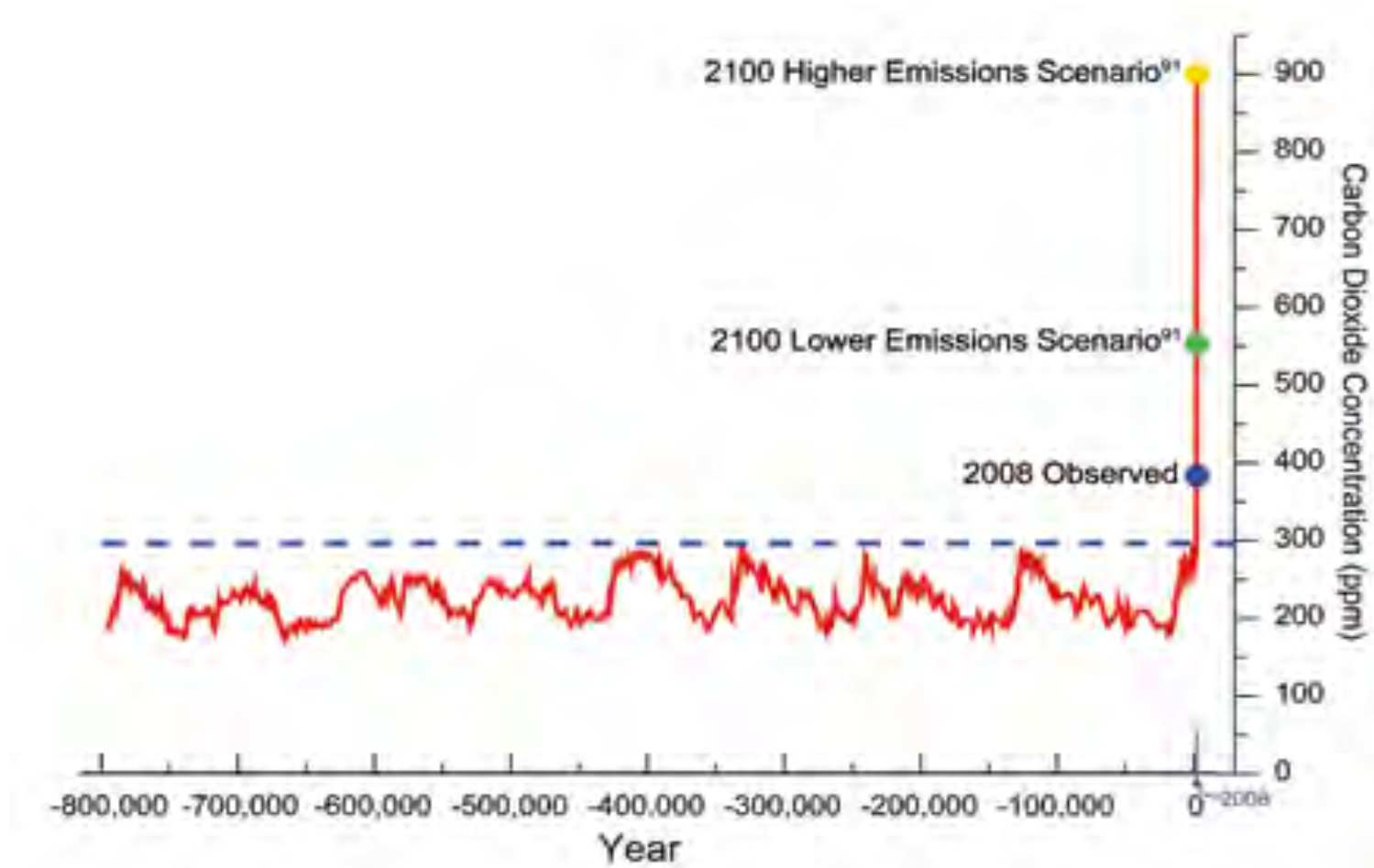
- Temperatures are increasing globally and regionally
 - 1.5° F increase in Pacific Northwest
- Human Caused



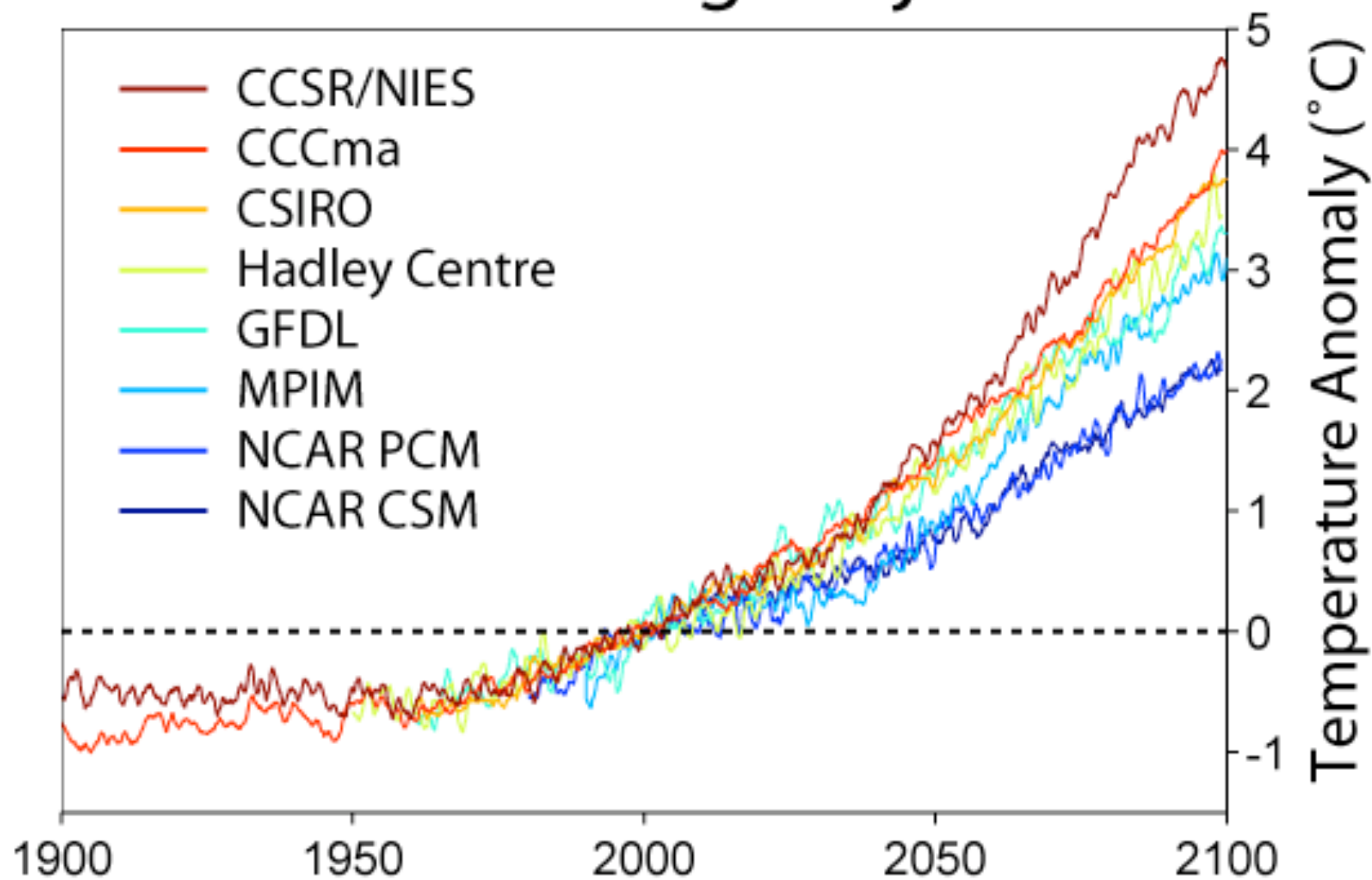
CO₂ Levels Past 800 K Years (NOAA 2009)

Source: Global Climate Change Impacts in the U.S., NOAA 2009

10



Global Warming Projections

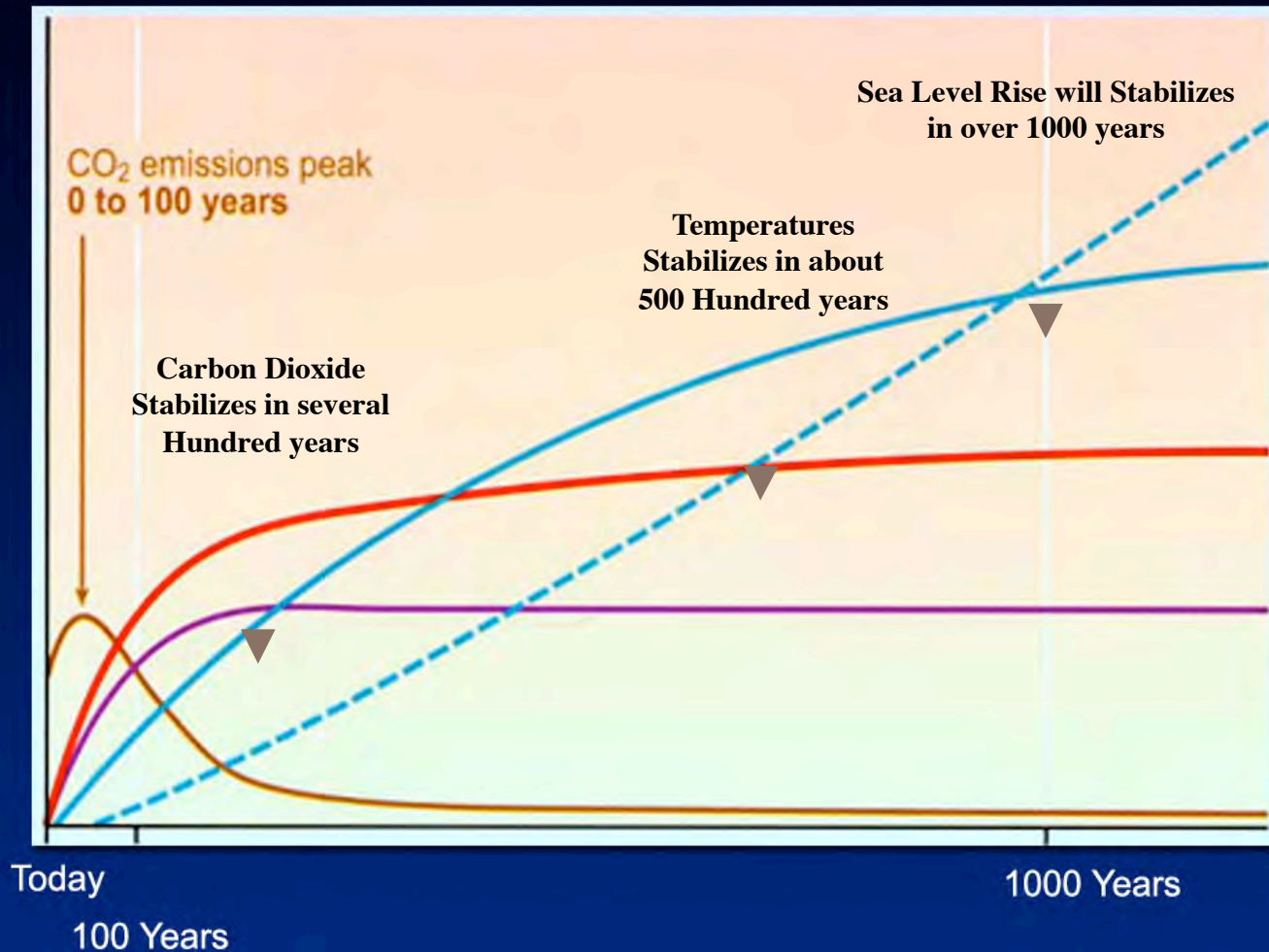




CO₂ concentration, temperature, and sea level continue to rise long after emissions are reduced

Magnitude

Time to Equilibrium



Sea-level rise due to ice melting:
SEVERAL MILLENNIA

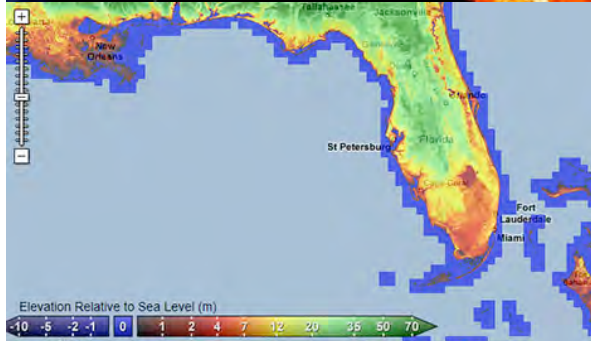
Sea-level rise due to thermal expansion:
CENTURIES TO MILLENNIA

Temperature Stabilization:
A FEW CENTURIES

CO₂ Stabilization:
100 to 300 YEARS

CO₂ Emissions

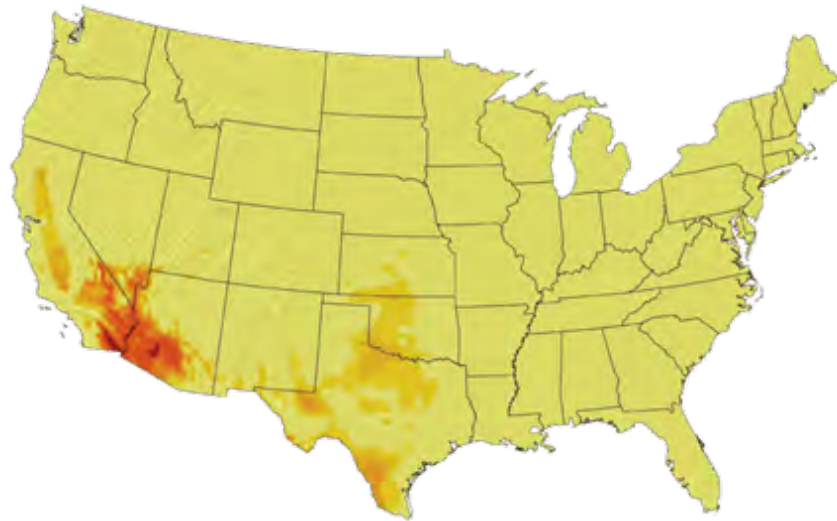
Global Projections for Change



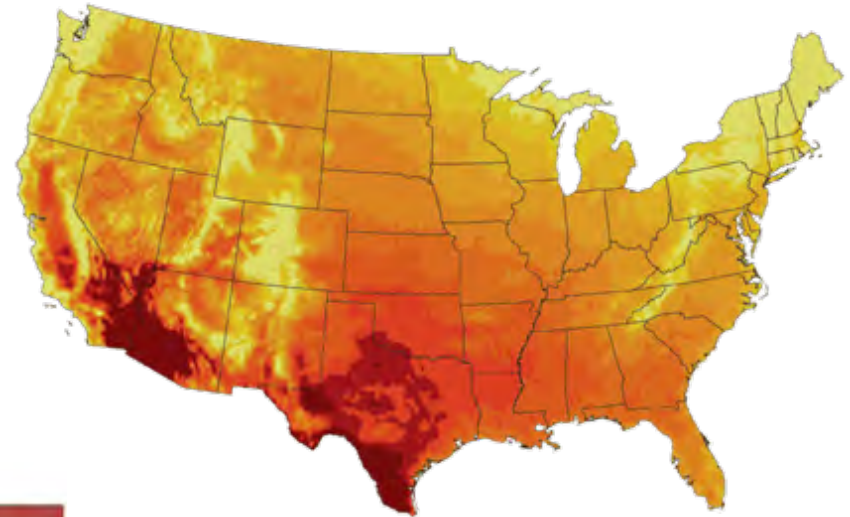
- **Higher Average Global Temperature**
- **Drought**
- **Heavy Precipitation**
- **Sea Level Rise**
- **Flooding**
- **Increased ozone levels**
- **Change in fire patterns**

Number of Days Over 100° F

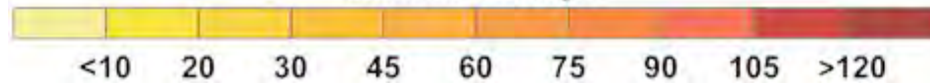
Recent Past, 1961-1979



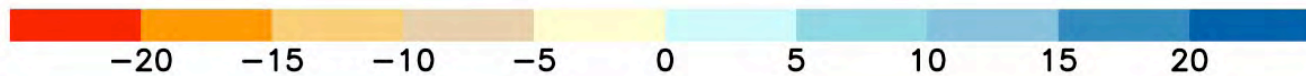
2080-2099



Number of Days



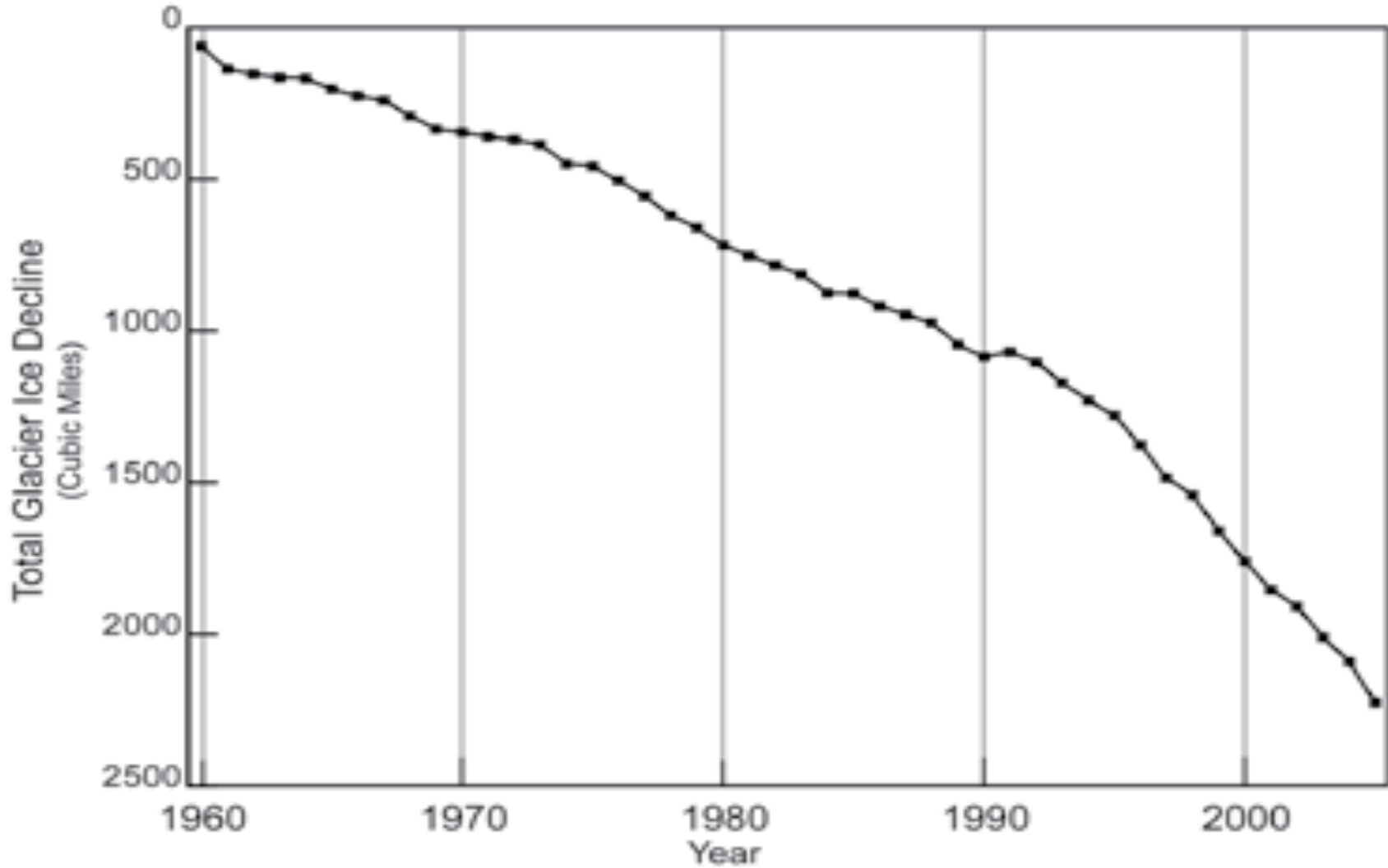
**Some areas are projected to become wetter,
others drier with an overall increase projected**



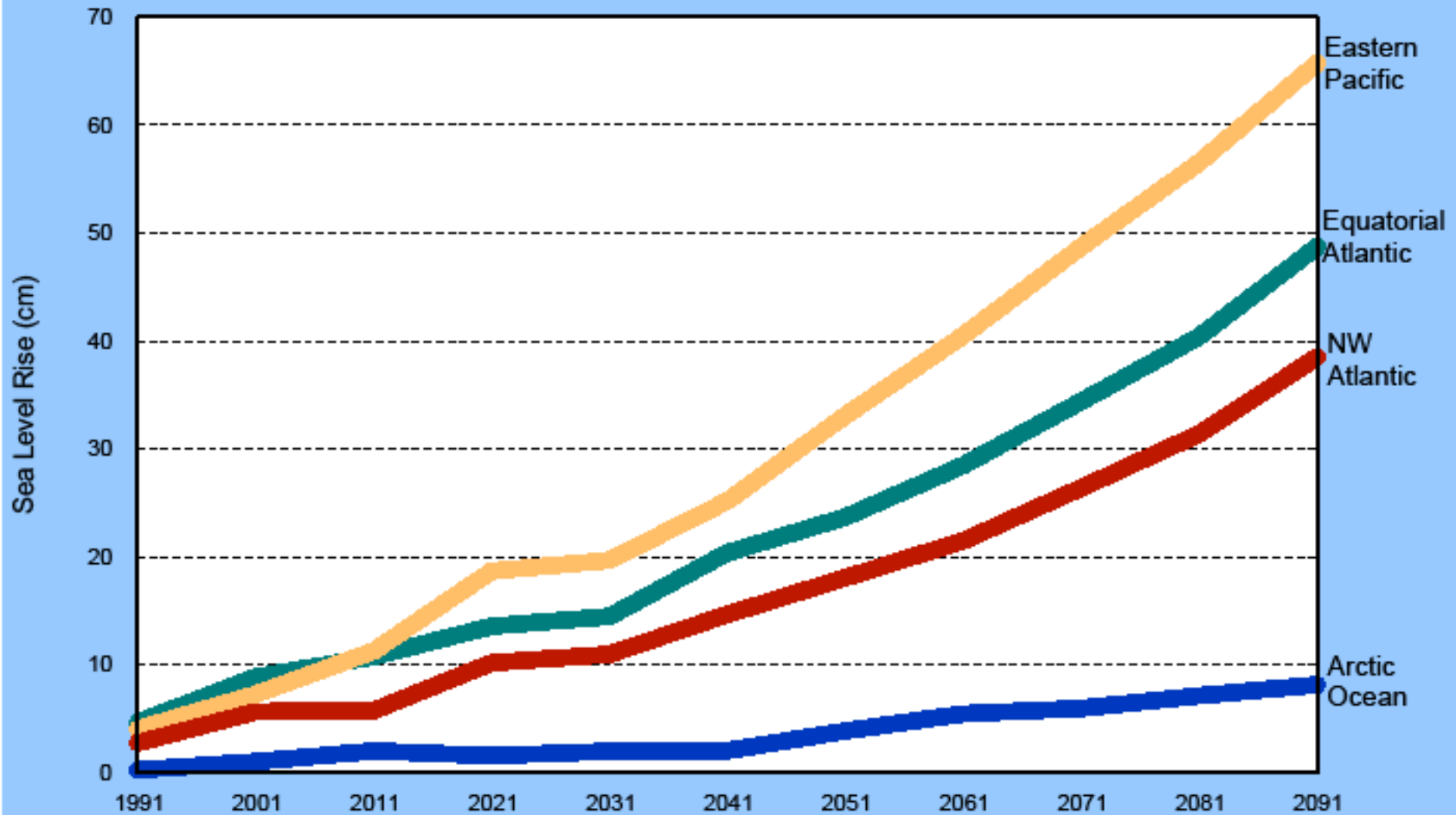
**Annual mean precipitation change:
2071 to 2100 relative to 1990**

Cumulative Decrease in Global Glacial Ice (1960-2010)

Source: Global Climate Change Impacts in the U.S., NOAA 2009

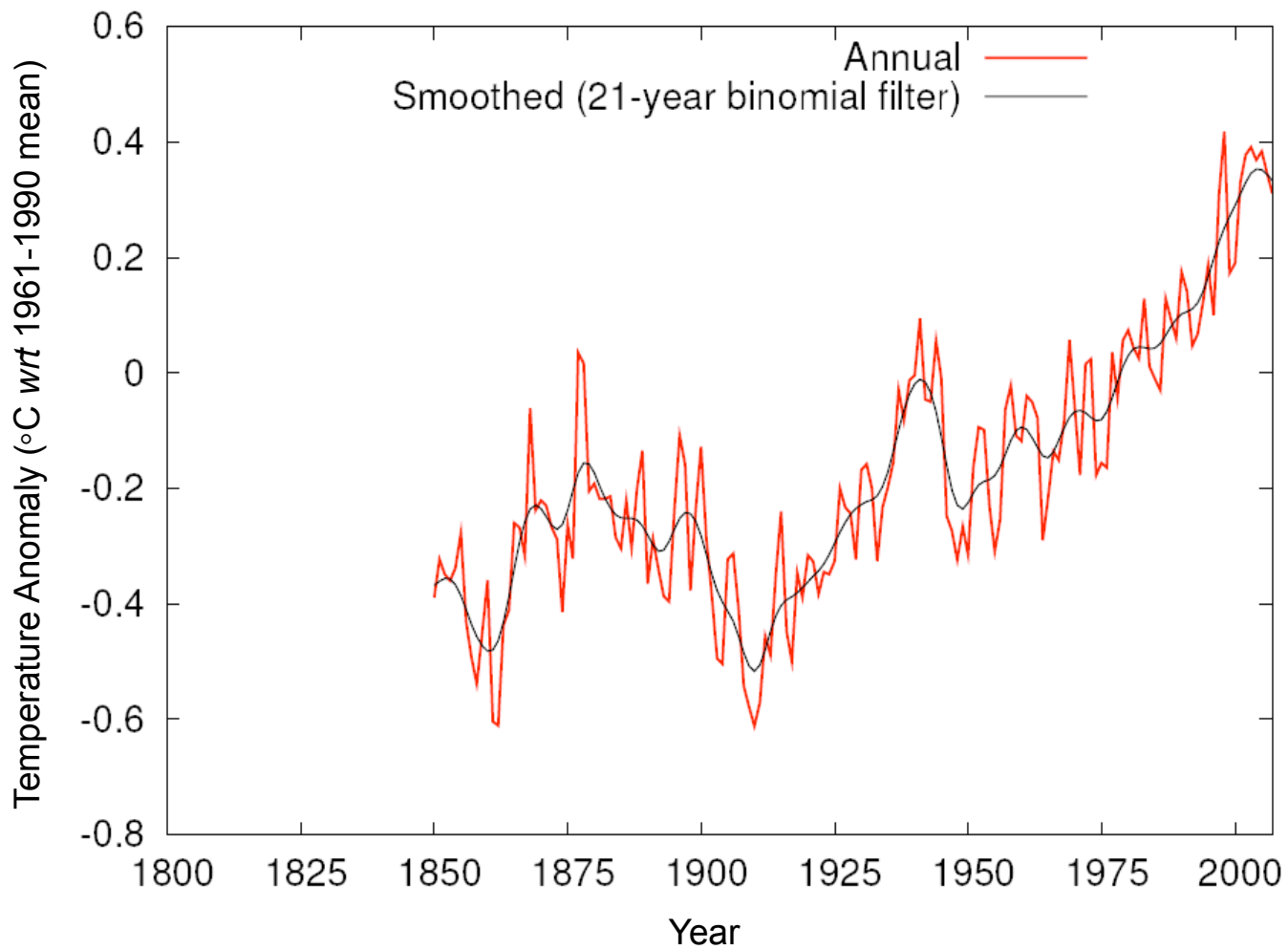


Regional Changes in Sea Level

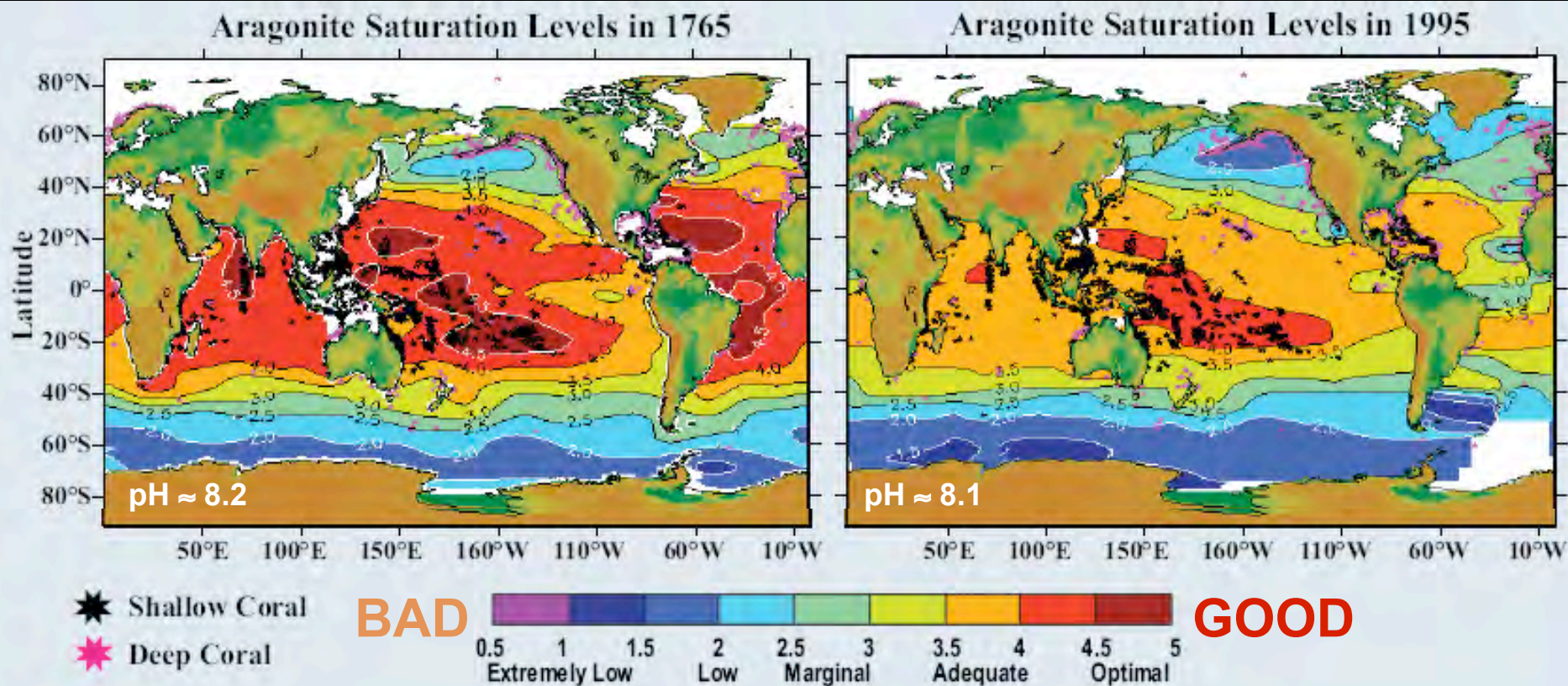


Source: Canadian Climate Change Model

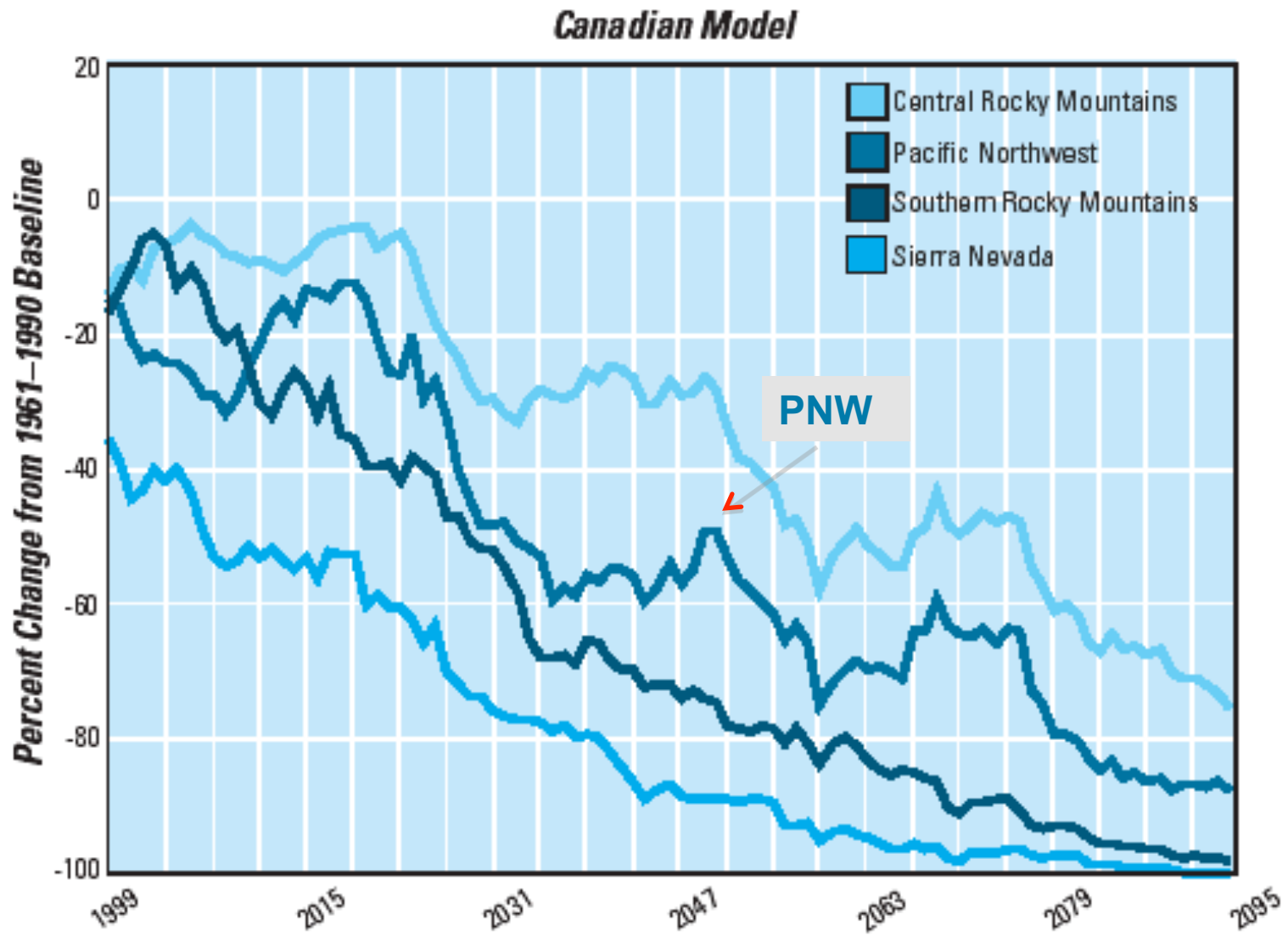
The Oceans Are Warming



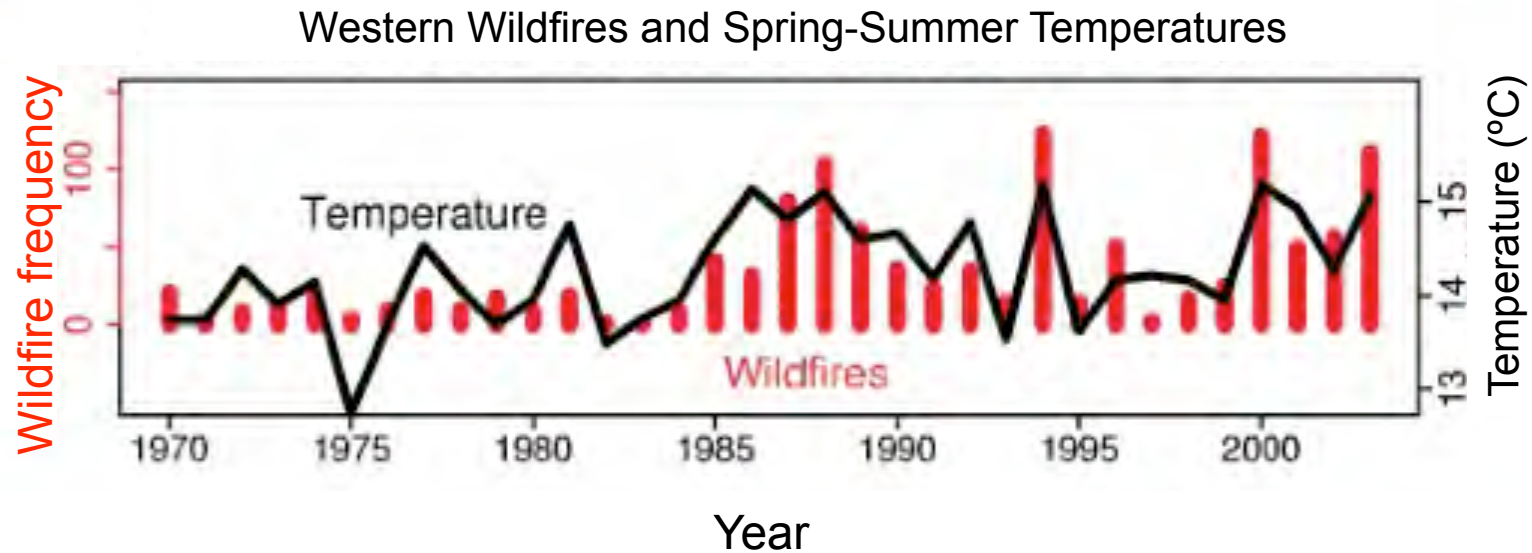
The Oceans Are Acidifying



Snowpacks are Projected to Diminish



Increasing Risk of Wildfire



6-fold increase in area burned since 1986

From Westerling et al. 2006. Science.

CO₂ Concentration Increasing at Alarming Rate

- ↑ CO₂ stimulates plant growth and drought resistance, but also...
 - ...favors invasive species and production of allergens.
- Ocean has absorbed one-third of all increases in atmospheric CO₂ since beginning of industrial revolution, but also...
 - ...ocean acidification has increased 30% and threatens formation of calcium carbonate in shellfish and phytoplankton and disruption of marine food chain.
- At current emissions trajectory CO₂ acidification will increase 150% by end of century

Source: 2010 NAS study team

Key Findings: USGCRP 2009 Report

- Temperatures in the US will rise 5-9 degrees F on average in the next 100 years.
- The potential impacts of climate change will vary widely across the nation (e.g. some areas drier, some wetter).
- Many ecosystems are highly vulnerable to the projected rate and magnitude of climate change.
- Widespread concern for change in water (drought, flooding, etc).
- Unknown impacts to agricultural sector (some areas more productive, others less).
- Near term increase in forest productivity (CO₂); long term loss (fire, disease, drought).
- Increased damage to coastal and permafrost areas, particularly to infrastructure.
- Health of human population likely to be impacted.
- Exacerbation of existing threats.
- Uncertainties remain and surprises expected.

Local Projections for Change

- **Temperature**
 - Average annual increase of 2 to 4° F (1 to 2° C) ~ 2040
 - Additional increase of 6 to 8° F (3 to 4° C) ~ 2080
- **Snowpack** likely to decline by 80% by 2080s
- **Fire** likely to increase in eastern parts of Basin
- **Precipitation** falling more as rain and in shorter periods of time
- **Streamflow** heavier in winter and early spring; reduced in summer
 - **Impacts on natural systems:** cold-water species, invasives, vegetation type, ecosystem services, stream flow
 - **Impacts on “community systems”:** health, hydroelectric power, transportation, crops, recreation, emergency and social services, population

Health Implications of Climate Change

Higher Average Temperature

heat illness, skin cancer

Drought

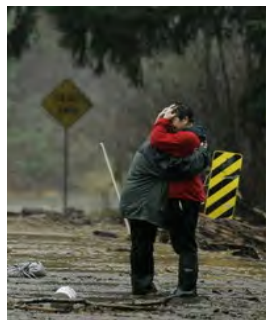
water quantity & quality, nutritional value of crops, mental illness

Heavy Precipitation

mental illness, water quality

Sea Level Rise

migration, water quality & quantity



Flooding

water quality, mental illness, disease breeding grounds

Increased ground ozone levels and CO₂

respiratory disease, asthma and allergies

Change in fire patterns

respiratory disease

Others?

Communicable disease, new diseases, food/water access





Climate change is likely to result in **additional public health costs in Oregon of up to \$900 million by 2020 and over \$1 billion by 2040**

(if no action is taken to prepare)

CLI & EcoNorthwest 2009

New Framing, Not New Issue



- Climate change is not a separate hazard in itself
 - Historical trends are not reliable for future planning
 - Consider how events will change in frequency and severity
- Not about adding work, but thinking creatively about integration and new collaborations.

Impacts to Public Health and Emergency Preparedness

- ❑ Disasters as threats to the public's health
- ❑ Abrupt increases in illness, injury, or death
- ❑ Disruption of infrastructure
- ❑ Population displacement
- ❑ Psychological stress
- ❑ Changes in the environment





**HHS 10
Essential
Services of
Public Health**

**CDC PHEP
Program**

**DHS National
Preparedness
Guidelines (NPG) and
Target Capabilities List
(TCL)**



SAFER • HEALTHIER • PEOPLE™













Increase in diseases, insect pests and plant pests



Disaster Management Cycle

Humanitarian Action

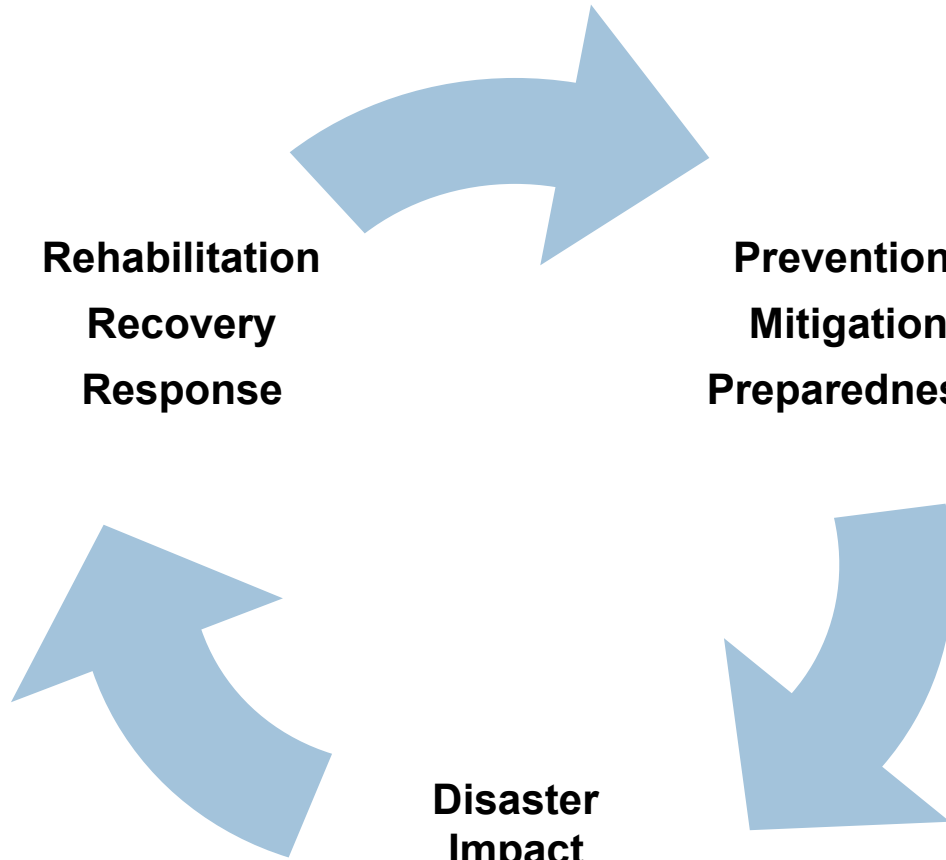


Sustainable development

Rehabilitation
Recovery
Response

Prevention/
Mitigation
Preparedness

Disaster
Impact



Capabilities-Based Planning

Surveillance and Intervention

Biosurveillance
Public Health Surveillance and Epidemiologic Investigation **
Public Health Laboratory Testing

Countermeasures and Mitigation
Responder Safety and Health
Medical Countermeasure Dispensing
Fatality Management
Non-Pharmaceutical Interventions
Mass Care

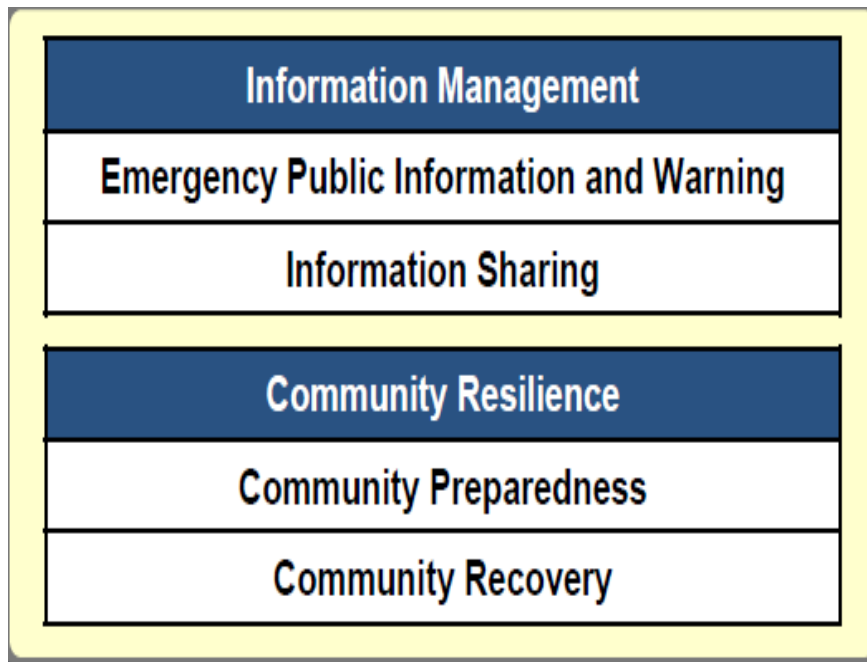
Capabilities-Based Planning

Emergency Management

Surge Management
Medical Supplies Management and Distribution
Volunteer Management and Recruitment
Medical Surge
Incident Management
Emergency Operations Coordination

Capabilities-Based Planning

General Program Capabilities

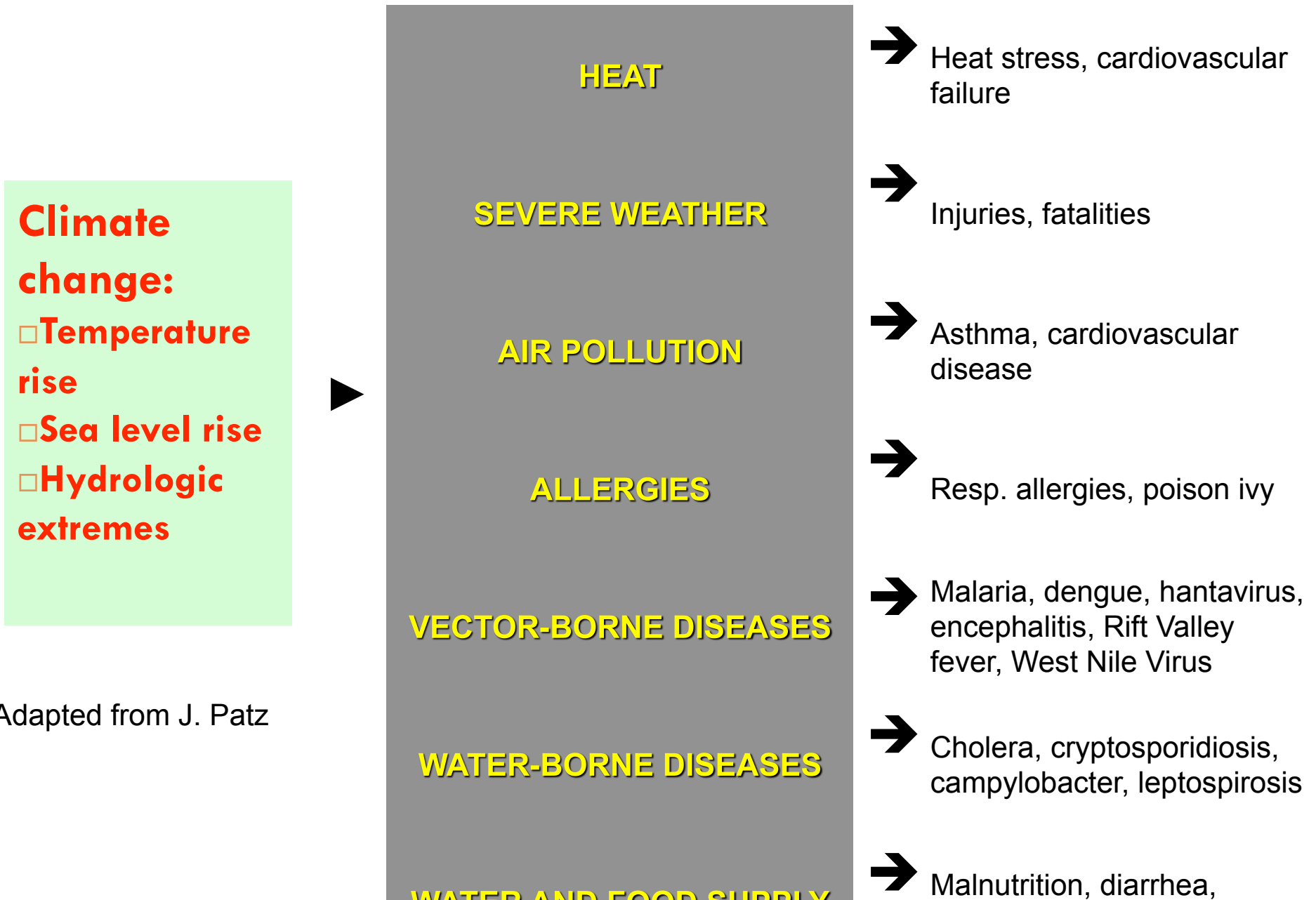


- Focus on communication:
 - internal
 - among partners
 - with the community
- Focus on increasing the ability of communities:
 - to survive and
 - rebound from disaster

Role of **Public** Health in Disasters

- Evaluate health impacts on communities and systems
- Assess water safety and sanitation
- Assist in shelter coordination
- Track disease, injuries, and fatalities
- Communicate what we know

Potential Health Effects of Climate Change



Adapted from J. Patz

Anticipated Events

Environmental Health Perspectives Volume 106, Number 3, March 1998

Dengue Fever Epidemic Potential as Projected by General Circulation Models of Global Climate Change

Jonathan A. Patz,¹ Willem J.M. Martens,² Dana A. Focks,³ and Theo H. Jetten⁴

¹ Department of Environmental Health Sciences, Johns Hopkins School of Hygiene and Public Health, Baltimore, MD 21205-2179 USA

² Department of Mathematics, Maastricht University, Maastricht, The Netherlands

³ Center for Medical, Agricultural and Veterinary Entomology, Agricultural Research Service, U.S. Department of Agriculture, Gainesville, FL 32604 USA

⁴ Department of Entomology, Graduate School for Production Ecology, Wageningen Agricultural University, Wageningen, The Netherlands

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Un-anticipated Events



PNAS

Proceedings of the National Academy of Sciences of the United States of America www.pnas.org

PNAS | December 7, 2004 | vol. 101 | no. 49

A rare genotype of *Cryptococcus gattii* caused the cryptococcosis outbreak on Vancouver Island (British Columbia, Canada)

S. E. Kidd^{*†‡}, F. Hagen[§], R. L. Tschärke[¶], M. Huynh[†], K. H. Bartlett[‡], M. Fyfe^{||}, L. MacDougall^{||}, T. Boekhout^{§***}, K. J. Kwon-Chung[¶], and W. Meyer^{*†,††}

Discussion

Until the recent emergence of cryptococcal infection on Vancouver Island, *C. gattii* had been considered to be restricted to areas with tropical and subtropical climates (2). The identification of large-scale colonization of *C. gattii* in the environment occurring in a temperate climate zone indicates a striking change in the distribution of this species. Furthermore, the identification of the *C. gattii*

New Framing, Not New Issue



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Framework for Change:

Climate Mitigation & Adaptation

- Mitigation: reductions in greenhouse gas emissions
- Adaptation: adjustments in natural or human systems in response to – or in anticipation of - climate change conditions or effects
 - ▣ Simultaneous implementation of strategies
 - ▣ Integration with existing programs, staff, funding
 - ▣ Focus both internally and through engagement with public
 - ▣ Unique opportunities for collaboration and grantmaking

What Are We Already Doing?

(preworkshop survey)

- Mix of knowledge from uninformed to very informed
- Majority are working on climate change on a voluntary basis because it's a personal interest – but part of job for some
- Highest concern around Heat, Flooding, Wildfire, Snowpack
- Health concerns range from cardiovascular disease to asthma and heat illness

What Are We Already Doing?



- Limited action taken on adaptation, but some surveillance and warning systems in place
- Many actions are in development: adaptation planning, scenario planning, public outreach, etc
- Popular mitigation programs include: walking/biking facilities, renewable energy, sustainable purchasing and compost
- Most are aware of Hazard Vulnerability Assessments and priorities include wildfire, flood, landslide, pandemic flu and earthquakes

Immediate Steps



- Conduct vulnerability assessments
- Assess capacity and existing operations
- Identify local partnerships for service provision
- Develop internal trainings, awareness building mechanisms for staff
- Develop neighborhood brigades to provide education and check in on at-risk individuals
- Identify opportunities for modifying outreach (brochures, trainings, brochures, media)

Medium Term Steps



- Develop strategies for reaching vulnerable populations
- Expand and update outreach and education materials to all sectors of community
- Implement trainings, neighborhood brigades
- Solidify partnerships
- Begin making internal changes to reduce GHG emissions

Long Term Steps



- Operationalize preparedness into all public health and emergency preparedness strategies
- Consider greenhouse gas emissions/energy consumption in decision-making
- Widespread outreach and provision of tools to mitigate against health risks and prepare for impacts

If You Only Remember 3 Things...



- Climate change is a public health issue
- Public health has an opportunity to be a leader
- Resources and tools are available to support action (focus for today!)

Those of us working in public health should recognize that climate disruption affects promoting good health for us all. There is an opportunity now for us to lead by example and take some responsibility for the impact on the Earth's climate.

-Dr. Mel Kohn (OHA)