

Appendix D

Climate Change Tools – Summary of Sources for Models, Data Analysis, and Decision Support

Table D-1: Data Sources

Data Type (e.g. Weather, hydrologic, geologic, etc.)	Repository Name	Agency	Web Link	Scope
Hydrologic, meteorologic, reservoir storage	California Data Exchange Center	DWR	http://cdec.water.ca.gov/	CA
Weather, agricultural	California Irrigation Management Information System (CIMIS)	CIMIS	http://www.cimis.water.ca.gov/cimis/welcome.jsp	CA
Climate, snow pack, wildfire, sea level projections	Cal Adapt	PIER	http://cal-adapt.org/	CA
Weather – radar	NCDC NEXRAD Data Inventory	NOAA/NCDC	http://www.ncdc.noaa.gov/nexradinv/	US
Radar, model results, satellite	Unidata Program	UCAR	http://www.unidata.ucar.edu/	US
Hydrologic	National Hydrography Dataset	USGS	http://nhd.usgs.gov/data.html	US
Geologic, hydrologic, weather, imagery, geographic	USDA Natural Resources Conservation Service Geospatial Data Gateway	USDA	http://datagateway.nrcs.usda.gov/	US
Climate data and modeling ecosystem and water quality data sea level rise and elevation data, state-specific resources	Climate Ready Estuaries Coastal Toolkit	EPA	http://www.epa.gov/climate-ready-estuaries/toolkit.html	US

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Geospatial wetland classification	National Wetlands Inventory	NOAA	http://www.csc.noaa.gov/digitalcoast/data/nwi/index.html	US
Elevation	Coastal Inundation Toolkit	NOAA	http://www.csc.noaa.gov/digitalcoast/inundation/index.html	US
Downscaled GCM climate projections	CMIP3 archive	Office of Science, US Department of Energy (via Lawrence Livermore National Laboratory, Reclamation, Santa Clara University, Climate Central	http://gdo-dcp.ucllnl.org/downscaled_cmip3_projections/dcpInterface.html	

Table D.2: Climate Change Analysis Tools

Tool Name	Description	Web Link	Public Domain (Y/N)?
Data Processing Tools			
CalAdapt	Synthesizes existing California climate change scenarios and climate impact research; provides interactive maps and charts, local profiles, community-based features, and background climate change information.	http://cal-adapt.org/	Y
Climate Wizard	Online tool that allows quick visualization of the CMIP3 downscaled dataset. Allows quick visual comparison among emissions scenarios and GCMs, and also visualizes ensemble results. Visualization of temperature and precipitation projections.	http://www.climatewizard.org/	Y
Pacific Institute Sea Level Rise GIS Data Downloads	Downloadable geographic data created or modified by Pacific Institute researchers for the project Impacts of Sea Level Rise on the California Coast	http://www.pacinst.org/reports/sea_level_rise/data/index.htm	Y
SimCLIM	GCM model/Scenario Comparison, Statistical Analysis. Interfaces with several other computational modeling tools.	http://www.climsystems.com/simclim/	N
Analytical Tools and Models			
ADCIRC	A system of computer programs for solving free surface water circulation and transport problems in 2D and 3D. Typical applications include: modeling tides and wind driven circulation, analysis of hurricane storm surge and flooding, dredging feasibility and material disposal studies, larval transport studies, near shore marine operations.	http://www.adcirc.org/	Y

Table D.2: Climate Change Analysis Tools

Tool Name	Description	Web Link	Public Domain (Y/N)?
BASINS	EPA tool for hydrologic and water quality data assessment and analysis. Contains tools for data extraction, processing, and evaluation. Contains several water quality models and interfaces with many other publicly available computational water models.	http://water.epa.gov/scitech/datait/models/basins/	Y
BASINS CAT	EPA tool for incorporating various climate change scenarios into BASINS analyses	http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=203460	Y
CAEDYM	3D process-based model of the major biogeochemical processes influencing water quality.	http://www.cwr.uwa.edu.au/software1/models/caedym/caedym.php	N
Climate Ready Estuaries Coastal Toolkit	Resources for estuaries and coastal programs that are interested in learning more about climate change impacts and adaptation	http://www.epa.gov/climatereadyestuaries/toolkit.html	Y
CREAT	Assists in understanding potential climate change threats and in assessing the related risks for individual utilities. Evaluates potential impacts of climate change adaptation options to address these impacts using both traditional risk assessment and scenario-based decision making.	http://water.epa.gov/infrastructure/watersecurity/climate/creat.cfm	Y
CUP+	The CUP+ program is an MS-Excel application written to make accurate estimates of both crop evapotranspiration (ETc) and evapotranspiration of applied water (ETaw).	http://www.water.ca.gov/landwateruse/models.cfm	Y
DHSVM	Distributed hydrologic model that explicitly represents the effects of topography and vegetation on water fluxes through the landscape.	http://www.hydro.washington.edu/Lettenmaier/Models/DHSVM/index.shtml	Y
Digital Coast, NOAA Coastal Services Center	Provides tools, training, and information for conserving and protecting coastal communities and natural resources	http://www.csc.noaa.gov/digitalcoast/about/index.html	Y
DSM2	One-dimensional hydrodynamic, water quality, and particle-tracking model. Calculates stages, flows, velocities; many mass transport processes, including salts, multiple non-conservative constituents, temperature, THM formation potential and individual particles.		

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Tool Name	Description	Web Link	Public Domain (Y/N)?
	Environmental Fluid Dynamics Code (EFDC Hydro) is a state-of-the-art hydrodynamic model that can be used to simulate aquatic systems in one, two, and three dimensions.	http://www.epa.gov/athens/wwqtsc/html/efdc.html	Y
ELCOM	3D hydrodynamics model used for simulating the velocity, temperature, and salinity distribution in natural water bodies subjected to external environmental forcing, such as wind stress, and surface heating or cooling.	http://www.cwr.uwa.edu.au/software1/models1.php?mdid=5	N
HEC-HMS	Computational rainfall runoff model	http://www.hec.usace.army.mil/software/hec-hms/	Y
HEC-RAS	1D River modeling, including temperature and sediment transport modeling	http://www.hec.usace.army.mil/software/hec-ras/hecras-hecras.html	Y
HSPF	Simulates for extended periods of time the hydrologic, and associated water quality, processes on pervious and impervious land surfaces and in streams and well-mixed impoundments.	http://water.usgs.gov/software/HSPF/	Y
MIKE 3	3D hydrodynamic model for simulating free surface flows and associated sediment or water quality processes.	http://www.mikebydhi.com/Products/CoastAndSea/MIKE3.aspx	N
NOAA Coastal Inundation Toolkit	Provides tools and information for understanding and addressing coastal flooding	http://www.csc.noaa.gov/digitalcoast/inundation/	Y
QUAL2K	1-dimensional steady state river and stream water quality model.	http://www.epa.gov/athens/wwqtsc/html/qual2k.html	Y
RMA2	Dynamic 2D depth-averaged model for computing water surface elevations and horizontal velocity components for subcritical, free-surface flow.	http://chl.erdc.usace.army.mil/rma2 http://www.aquaveo.com/rma2	N
RMA4	Water quality transport numerical model.	http://chl.erdc.usace.army.mil/rma4 http://www.aquaveo.com/rma4	N

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Tool Name	Description	Web Link	Public Domain (Y/N)?
SIMETAW/Cal-SIMETAW	Simulates many years of weather data from monthly climate data and to estimate reference evapotranspiration (ET _o) and crop evapotranspiration (ET _c) with the simulated data. Determines effective rainfall and ET of applied water (ET _{aw}).	http://www.water.ca.gov/landwateruse/models.cfm	Y
SLAMM	Simulates potential impacts of long-term sea level rise on wetlands and shorelines.	http://www.csc.noaa.gov/digitalcoast/tools/slam/index.html	Y
SWMM	Urban hydrology and conveyance system hydraulics software. Provides dynamic rainfall-runoff simulation of single event or long-term (continuous) simulation of runoff quantity and quality from primarily urban areas.	http://www.epa.gov/nrmrl/wswrd/wq/models/swmm/	Y
UNTRIM	3D hydrodynamics model used for simulating velocity, temperature and salinity distribution in natural water bodies.	N/A, model developed by Prof. Vincenzo Casulli of Trento University	Y
VIC	Macroscale hydrologic model that solves full water and energy balances	http://www.hydro.washington.edu/Lettenmaier/Models/VIC/	Y
WASP	Dynamic compartment-modeling program for aquatic systems, including both the water column and the underlying benthos. Allows the user to investigate 1, 2, and 3 dimensional systems, and a variety of pollutant types	http://www.epa.gov/athens/wwqts/html/wasp.html	Y
WEAP	Calculates water demand, supply, runoff, infiltration, crop requirements, flows, and storage, and pollution generation, treatment, discharge and instream water quality under varying hydrologic and policy scenarios.	http://www.weap21.org/	Y

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Tool Name	Description	Web Link	Public Domain (Y/N)?
Decision-Support Tools			
Criterion DecisionPlus	Used for complex decisions such as those found in regional water resources planning. CDP is especially useful for decisions that involve numerous competing objectives.	http://ebmtoolsdatabase.org/tools	N
@RISK	Performs risk analysis using Monte Carlo simulation to show you many possible outcomes in your Microsoft Excel spreadsheet—and tells you how likely they are to occur.	http://www.palisade.com/risk/	N
STELLA	Integrated systems model using use object-oriented programming. Provides a built-in graphical interfaces and output. Useful for comprehensive simulation of water, biological, or financial systems. Can demonstrate how many different types of systems respond dynamically.	http://www.iseesystems.com/software/Education/StellaSoftware.aspx	N
Climate Ready Estuaries Coastal Toolkit	Resources for estuaries and coastal programs that are interested in learning more about climate change impacts and adaptation	http://www.epa.gov/climate/readyestuaries/toolkit.html	Y
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