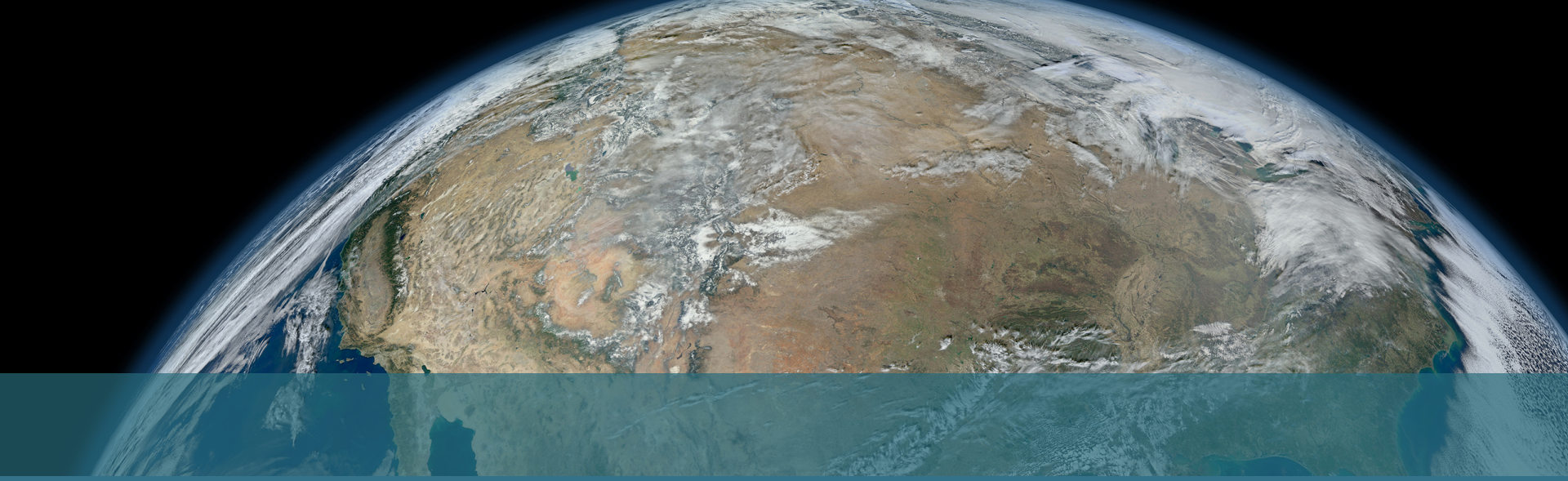


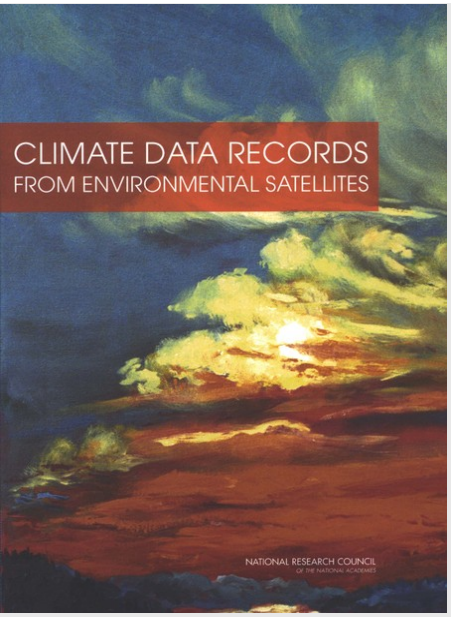
The Path Forward: Maintaining the NOAA CDR Program in a Constrained Budget Environment

Terry McPherson
LMI Senior Consultant
Center for Weather and Climate
NOAA's National Centers for Environmental Information

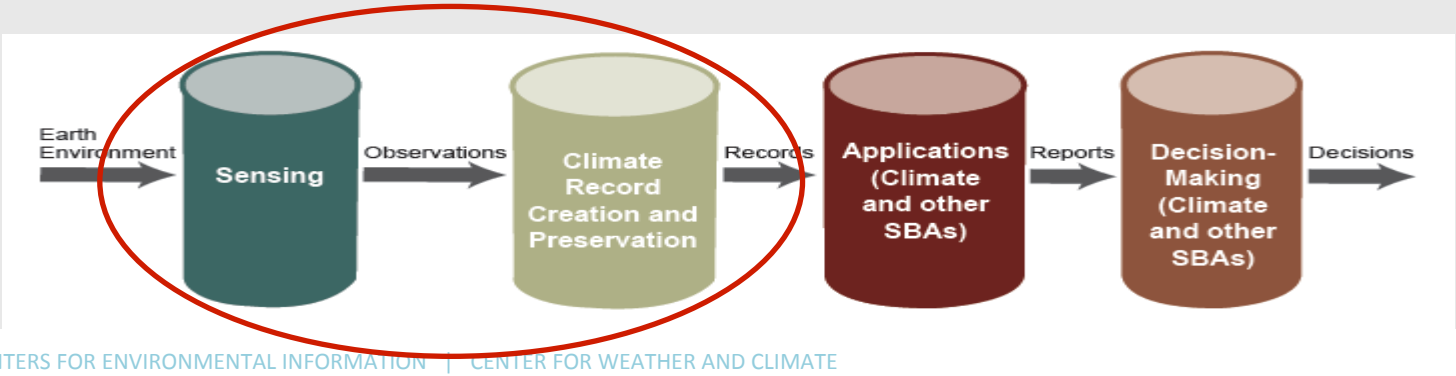
August 4, 2015

The Past

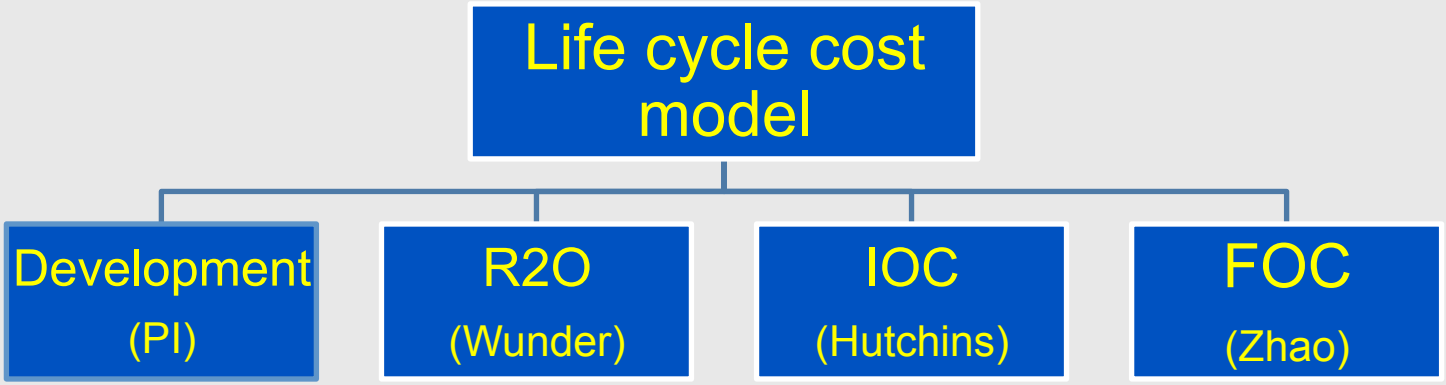
The Path to Achieving Success



- National Research Council (NRC) of National Academy of Sciences (NAS) (2004)
- Office of Science and Technology (OSTP), NOAA/NESDIS guidance
- Scientific Data Stewardship (SDS) Program (2007 & 2008)
- The American Recovery and Reinvestment Act of 2009 (ARRA)
- FY 2009 First NOAA CDR Grant Opportunity (FFO)
- FY 2010 First time as a NOAA Budget Line
- FY 2011 Second NOAA CDR Grant Opportunity (FFO)



Elements of Producing and Sustaining a CDR

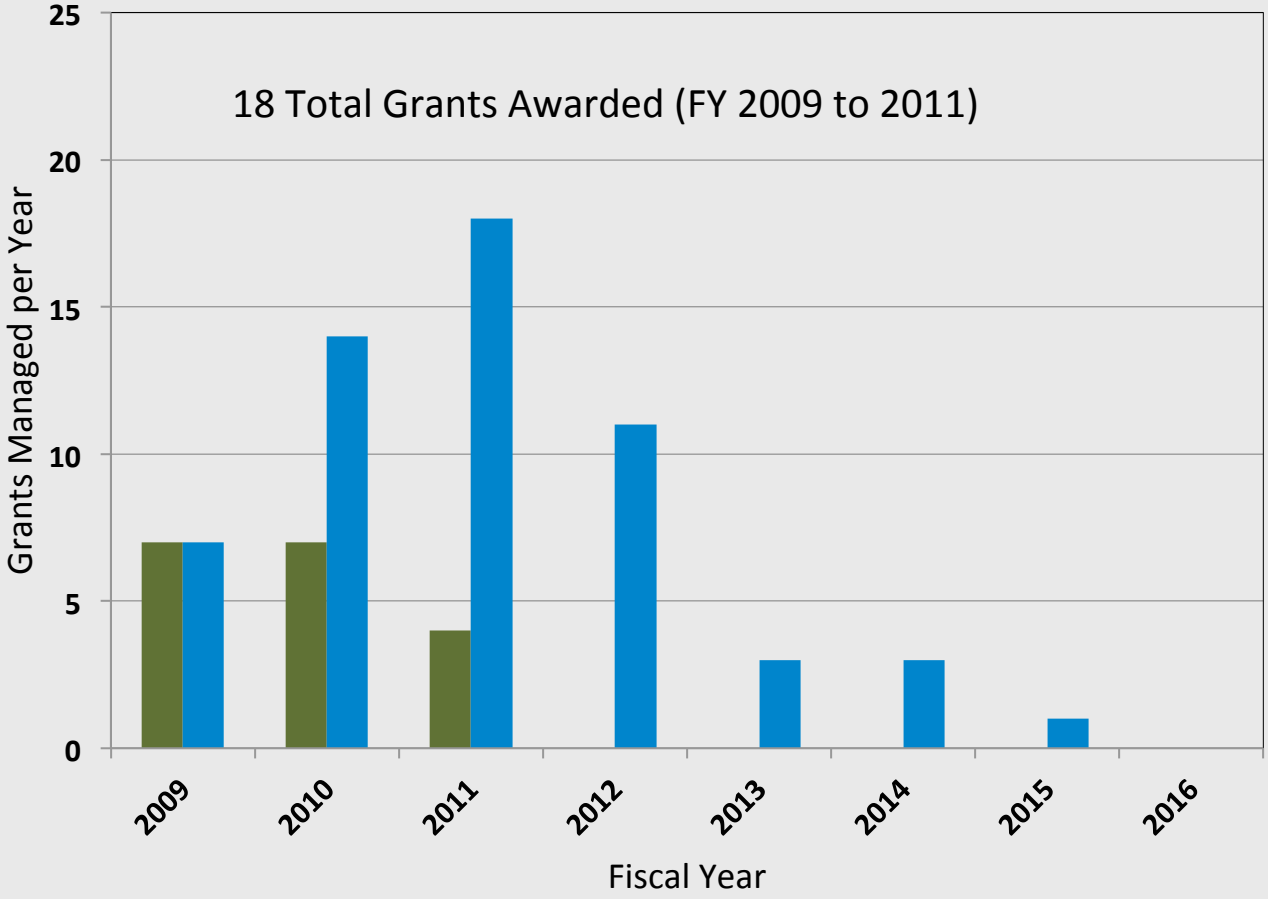


Future Mission success depends on balancing opportunities, challenges, and risks

(Next Five Years)

R2O – Research to Operations
IOC – Initial Operational Capability
FOC – Full Operational Capability

CDR Competitive Grants (PIs)



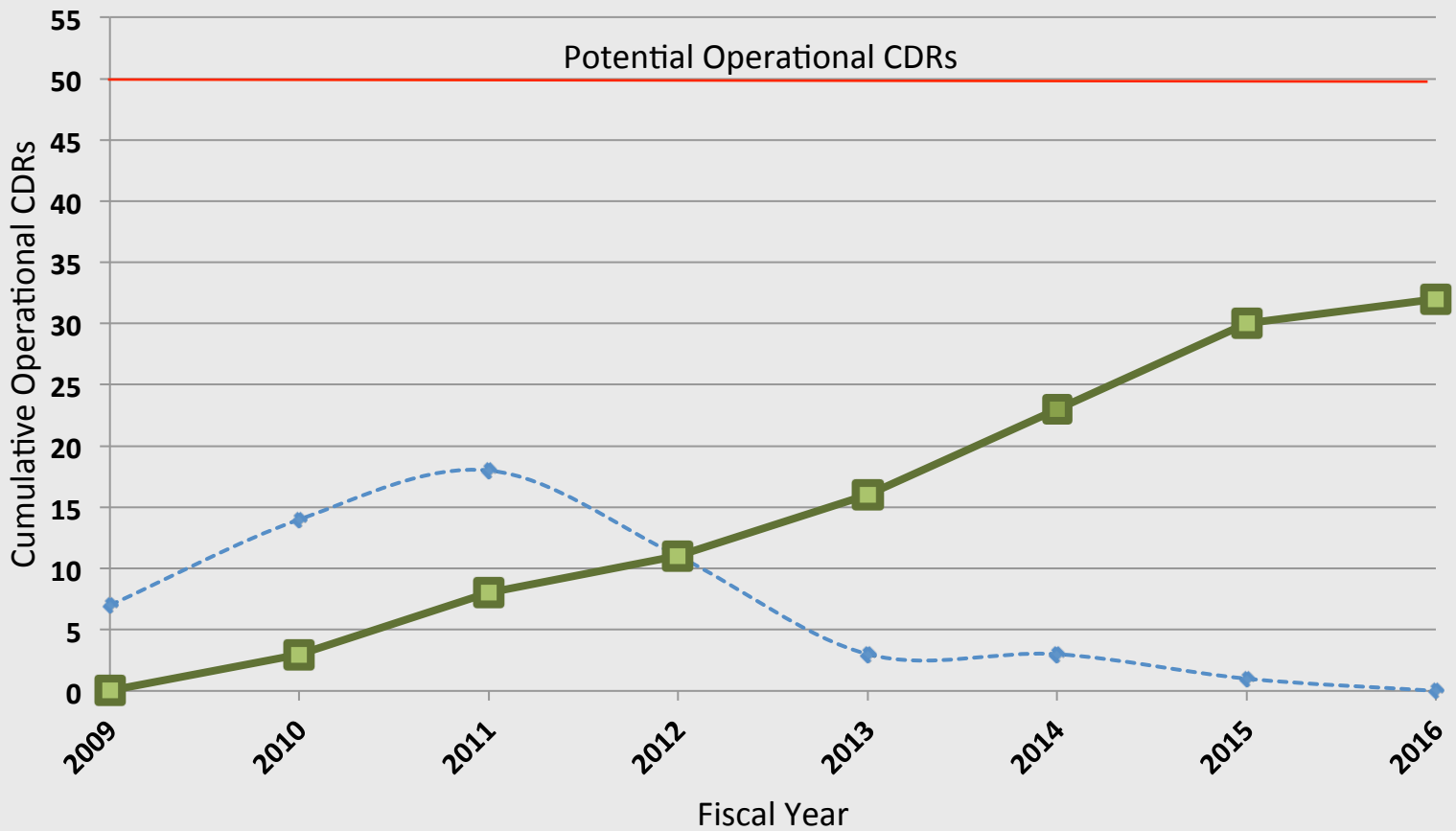
Early "bow wave" of competitive grants

- 7 Grants awarded in FY 2009
- 7 Grants awarded in FY 2010
- 4 Grants awarded in FY 2011

New Grants per year

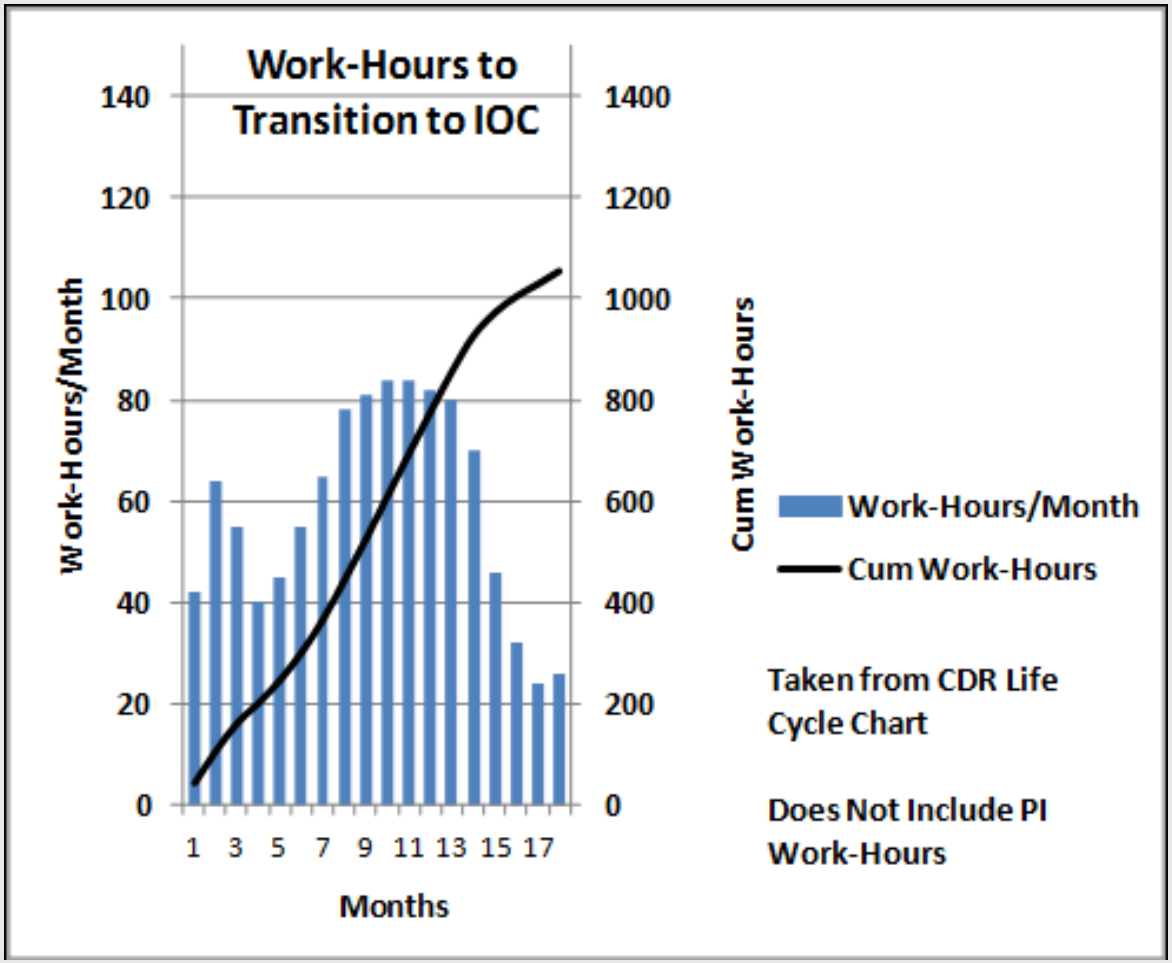
Cumulative Grants Funded Per Year

Growth of Operational CDRs



- Early "bow wave" of CDRs bundles from competitive grants program
- Still 20+ more individual CDRs "in the Pipeline"
- Sustainment costs will determine operational CDR carrying capacity

NCEI Archive & Ingest is an Integral Part of the CDR Program



- NCEI Cost of Data Management
- The Learning Curve improves Performance
  - FY 2012 required over 1000 hours; 17 months
  - FY 2015 reduced to <500 hours; 12 months

Climate Data Record Program Pipeline

The Program Office has a Long Range Planning scheduled thru FY 2025

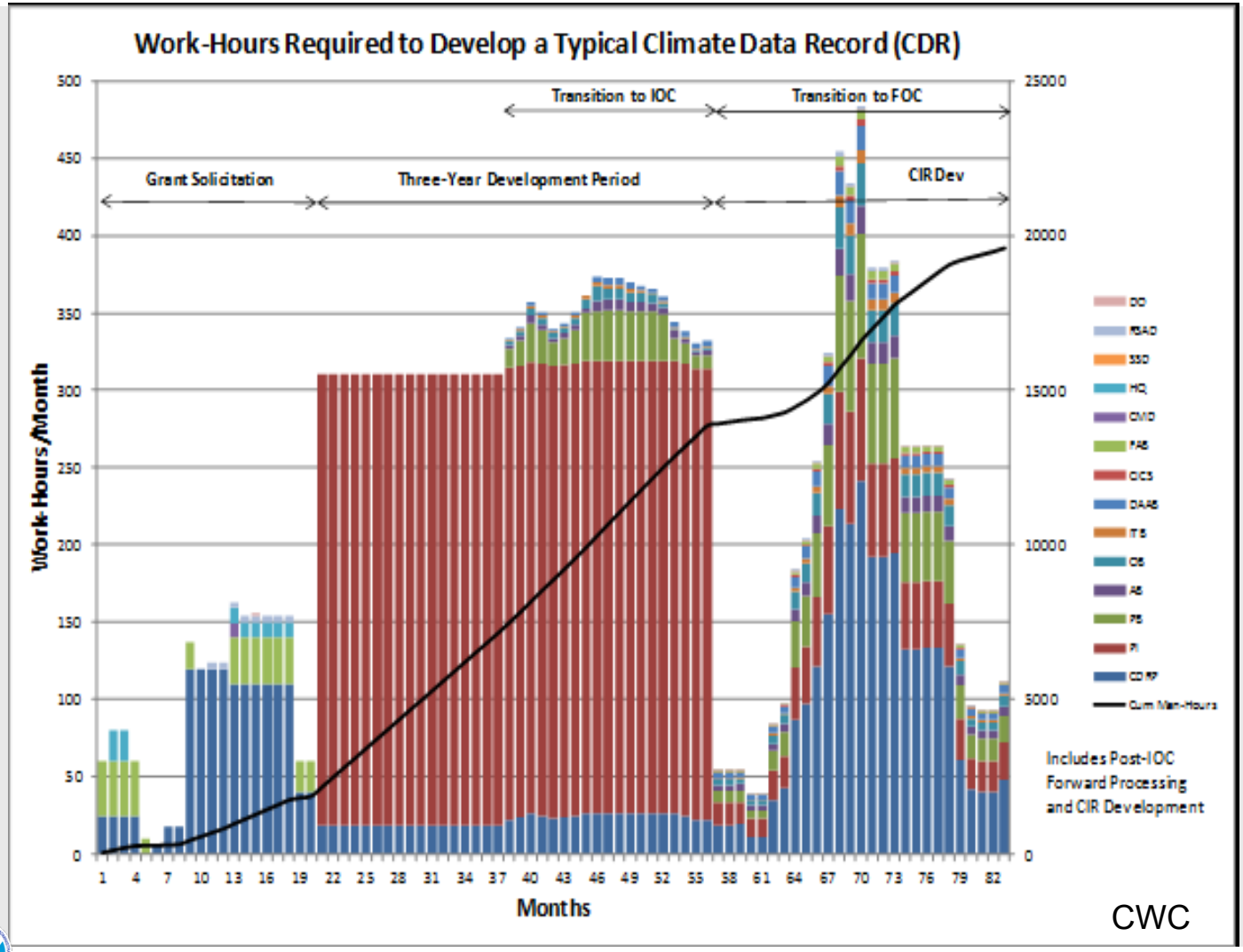
- Research to Operations (R2O)
- Sustaining Initial Operational Capability (IOC)
- Full Operational Capability (FOC)

Climate Data Record Program Pipeline

Version as of May 31, 2015

	CLIMATE DATA RECORDS	Configuration Item ID	PI	NCDC POC	Sci Priority	App Priority	Precedence	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Mean Layer Temperatures																				
1	Mean Layer Temperature - UCAR (Lower Stratosphere)																			
	(1978-present) Ch 4/9 CDR Development:	01B-07	Ho	Shi	1	2	2	Grant ends 07-31-09	No Funding	No Funding/IOC	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M
												[CR]		[CR						
2	Mean Layer Temperature - UCAR (Troposphere and Stratosphere)																			
	(1978-present) Ch 3/7 CDR Development:	01B-14	Ho	Shi	1	2	2	Grant ends 07-31-09	No Funding	No Funding	No Funding	R2O	IOC	O&M	O&M	O&M	O&M	O&M	O&M	O&M
														[CR						
3	Mean Layer Temperature - UAH																			
	CDR Development:	01B-10	Christy	Shi	1	2	2		ARC	R2O	IOC	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M
	CMB Dependency											[CR]		[CR						
4	Mean Layer Temperature - RSS																			
	CDR Development:	01B-13	Mears	Kim	1	2	2		Grant ends 06-30-10	No Funding	R2O	IOC	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M
	CMB Dependency																			
5	Mean Layer Temperature - NOAA																			
	CDR Development:	01B-25	Zou	Semunegus	3	3	3				Grant ends 05-31-12/No Cost Ext	R2O	R2O	IOC	O&M	O&M	O&M	O&M	O&M	O&M
6	MSU Mean Layer Temperature - NOAA																			
	CDR Development:	01B-31	Zou	Semunegus	3	3	3					R2O	IOC	Static Delivery	Retire					
Sea Surface Temperatures																				
7	Sea Surface Temperature – Pathfinder																			
	CDR Development:	01B-08	Baker-Yeboah	Zhang	1	1	2	Grant ends 04-30-09	R2O	IOC	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M
												[CR	CR	CR						
8	Sea Surface Temperature - WHOI																			
	CDR Development:	01B-27a	Clayson	Peng	1	1	3					Grant ends 06-30-13/R2O funding	R2O	IOC	O&M	O&M	O&M	O&M	O&M	O&M
9	Sea Surface Temperature - Optimum Interpolation																			
	CDR Development:	01B-09	Banzon	Banzon	1	1	3					IOC	FOC candidate	FOC candidate	Maint.	Maint.	Maint.	Maint.	Maint.	Maint.
SSMI(S) Brightness Temperatures																				
10	SSMI(S) Brightness Temperature - RSS																			
	CDR Development:	01B-05	Wentz	Semunegus	1	1	1			IOC	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M	O&M
											[CR	CR]								
11	SSMI(S) Brightness Temperature - CSU																			
	CDR Development:	01B-15	Kummerow	Semunegus	1	1	1				Grant ends 06-30-12/No Cost Ext	IOC	FOC candidate	O&M	O&M	O&M	O&M	O&M	O&M	O&M
														[CR						

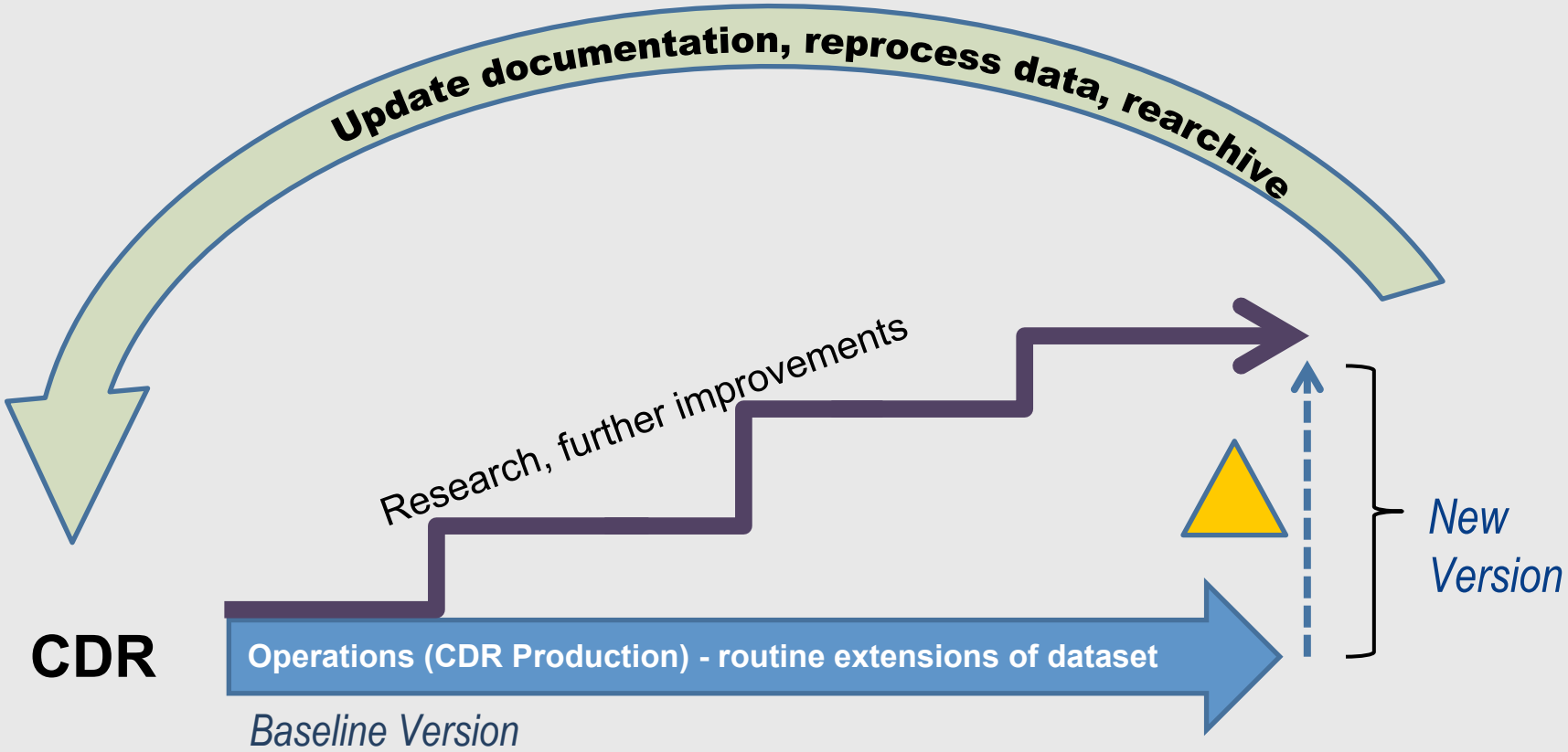
Life Cycle Cost Model from FY 2012



Cost to achieve Full Operation Capability (FOC)

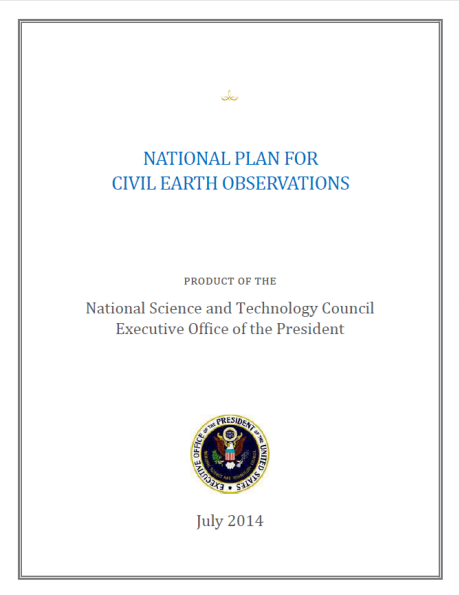
- Cost of Grant Solicitation is well known
- Cost to Develop is well known
- Cost to R20 is well known and becoming less
- Estimated cost of FOC may be low; software rejuvenation is a primary cost

Affordability of a New Version



Configuration control is necessary for scientific defensibility

Roadmap to The Future



White House OSTP - 2014

Department of Commerce - 2014

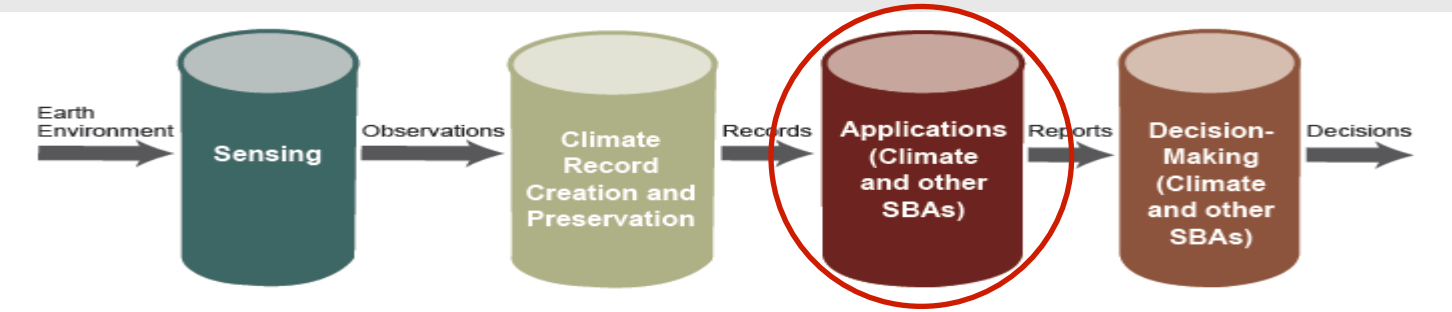
NOAA

US Global Change Research Plan - 2012

NOAA CDR Program Evolution

CDR Program moved in 2013 towards "Use-Inspired" CDRs

- Selections based on **best use**, broadened scope to all Societal Benefit Areas
- Focused on **engagement with industry and public** to identify their needs and prioritize the CDRs capable of meeting those needs.
- Defined **R2O processes**, cost-estimates, policies, and procedures for transition activities and information preservation.
- Execution through NOAA-coordinated **contracts** with other agencies, universities, or private industry, following project, configuration and risk management best practices.



CDRs Supporting Applications & Decision Support

CWC

Future Priorities

3 ENVIRONMENT

Ensure communities and businesses have the necessary information, products, and services to prepare for and prosper in a changing environment

3.1. Advance the understanding and prediction of changes in the environment through world class science and observations (NIST, NOAA)

3.2. Improve preparedness, response, and recovery from weather and water events by building a Weather-Ready Nation (ESA, NOAA)

3.3. Strengthen the resiliency of communities and regions by delivering targeted services to build capacity (EDA, ESA, NIST, NOAA)

3.4. Foster healthy and sustainable marine resources, habitats, and ecosystems through improved management and partnerships (NOAA)

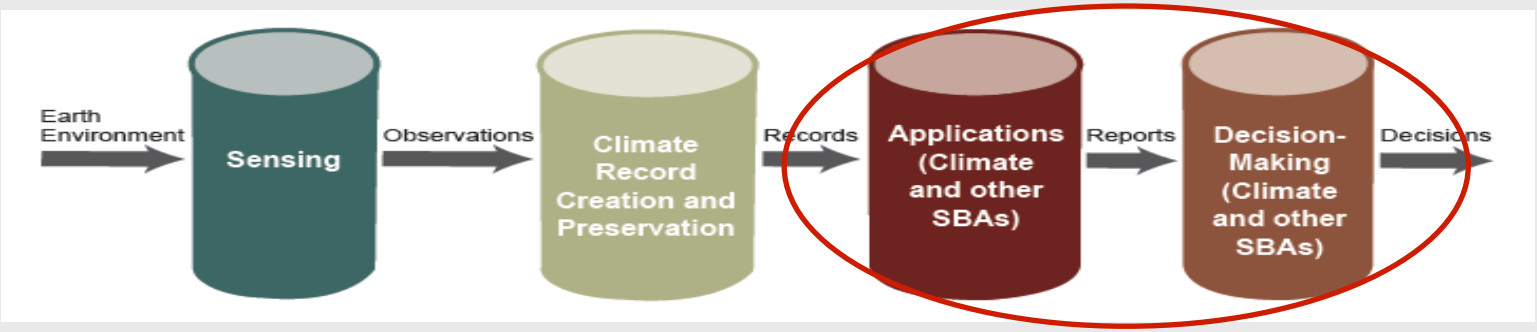
3.5. Enable U.S. businesses to adapt and prosper by developing environmental and climate-informed solutions (ESA, ITA, NIST, NOAA)

1. Partner with End Users
   - Enable U.S. businesses to adapt and prosper by developing environmental and climate-informed solutions
   - Focus on user requirements
   - Stakeholders feedback on requirements for CDRs
2. Sustain – Initial Operational Capability (IOC) CDRs
   - Commitment to external partners
   - Maintain internal work force
   - Reprocessing a CDR with new information driven by stakeholders needs
3. Full Operational Capability (FOC) CDRs

Some Future Opportunities

- NOAA's CDR Program seeks assistance in reaching new users, promoting applications tied to CDRs
- Interoperability with other data types (e.g., health, business, agriculture) and multiple CDRs applied to targeted societal issues
- End Users are requesting lower latency Interim CDRs (ICDRs)
- Transition from IOC to FOC is important to ensure long term preservation

- Fiscal Observations
  - NOAA acquisition process (IAA's, Cooperative Institutes, Grants)
  - NOAA supports operations thru contracts
  - FOC; software rejuvenation is challenging
  - Internal efficiencies are reducing costs



NOAA's National Centers for Environmental Information

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