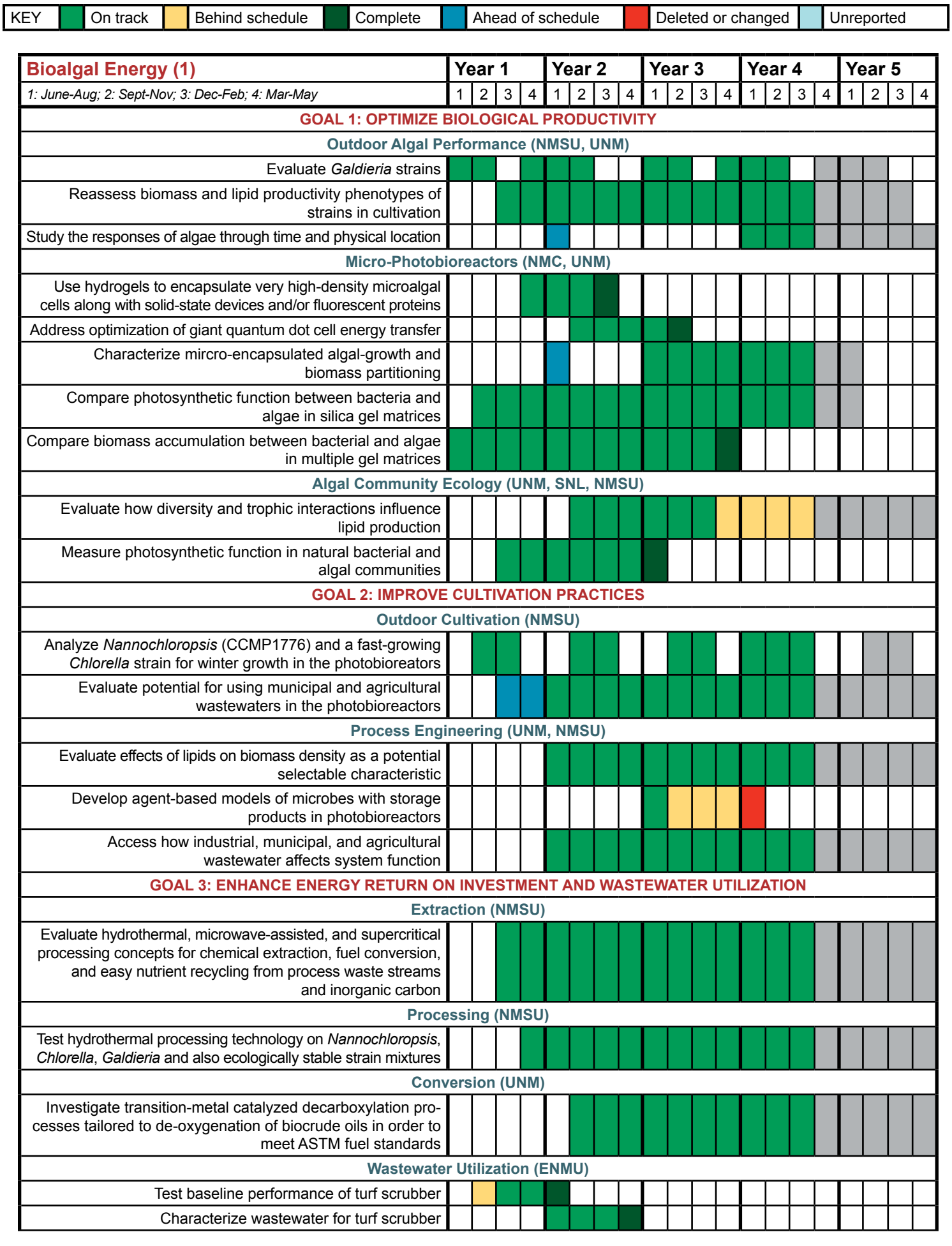
KEY
On track
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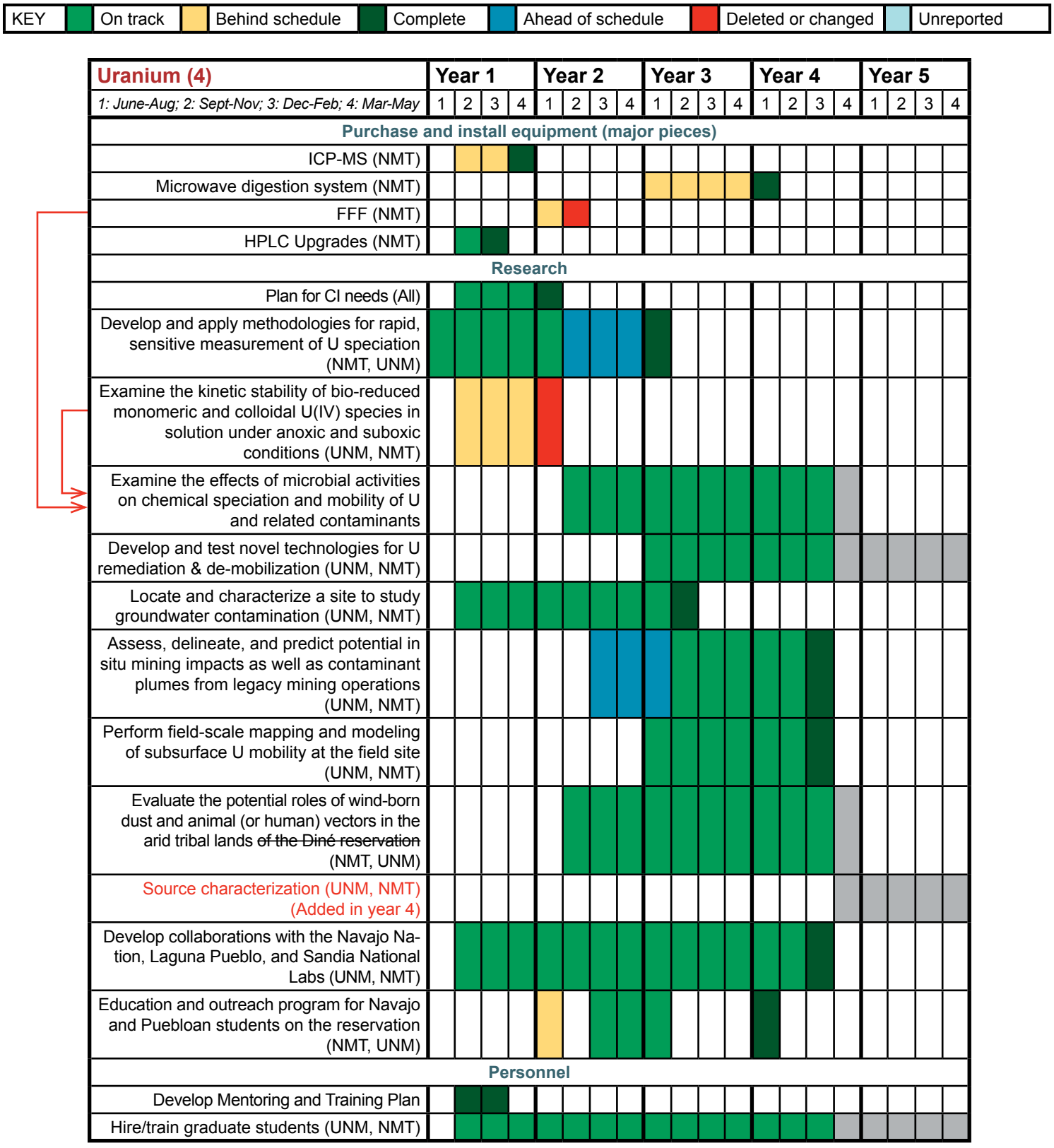
Bioalgal Energy (1)
Year 1
Year 2
Year 3
Year 4
Year 5
1: June-Aug; 2: Sept-Nov; 3: Dec-Feb; 4: Mar-May
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
GOAL 1: OPTIMIZE BIOLOGICAL PRODUCTIVITY
Outdoor Algal Performance (NMSU, UNM)
Evaluate Galdieria strains
Reassess biomass and lipid productivity phenotypes of strains in cultivation
Study the responses of algae through time and physical location
Micro-Photobioreactors (NMC, UNM)
Use hydrogels to encapsulate very high-density microalgal cells along with solid-state devices and/or fluorescent proteins
Address optimization of giant quantum dot cell energy transfer
Characterize mircro-encapsulated algal-growth and biomass partitioning
Compare photosynthetic function between bacteria and algae in silica gel matrices
Compare biomass accumulation between bacterial and algae in multiple gel matrices
Algal Community Ecology (UNM, SNL, NMSU)
Evaluate how diversity and trophic interactions influence lipid production
Measure photosynthetic function in natural bacterial and algal communities
GOAL 2: IMPROVE CULTIVATION PRACTICES
Outdoor Cultivation (NMSU)
Analyze Nannochloropsis (CCMP1776) and a fast-growing Chlorella strain for winter growth in the photobioreators
Evaluate potential for using municipal and agricultural wastewaters in the photobioreactors
Process Engineering (UNM, NMSU)
Evaluate effects of lipids on biomass density as a potential selectable characteristic
Develop agent-based models of microbes with storage products in photobioreactors
Access how industrial, municipal, and agricultural wastewater affects system function
GOAL 3: ENHANCE ENERGY RETURN ON INVESTMENT AND WASTEWATER UTILIZATION
Extraction (NMSU)
Evaluate hydrothermal, microwave-assisted, and supercritical processing concepts for chemical extraction, fuel conversion, and easy nutrient recycling from process waste streams and inorganic carbon
Processing (NMSU)
Test hydrothermal processing technology on Nannochloropsis, Chlorella, Galdieria and also ecologically stable strain mixtures
Conversion (UNM)
Investigate transition-metal catalyzed decarboxylation processes tailored to de-oxygenation of biocrude oils in order to meet ASTM fuel standards
Wastewater Utilization (ENMU)
Test baseline performance of turf scrubber
Characterize wastewater for turf scrubber

KEY	On track	Behind schedule	Complete	Ahead of schedule	Deleted or changed	Unreported

Bioalgal Energy (1)	**Year 1**				**Year 2**				**Year 3**				**Year 4**				**Year 5**			
1: June-Aug; 2: Sept-Nov; 3: Dec-Feb; 4: Mar-May	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Test turf scrubber with wastewater, and analyze nutrient and BOD removal																				
CROSS-CUTTING INFRASTRUCTURE																				
NMSU's Chemical Analysis and Instrumental Laboratory																				
Provide Overall Project Support (NMSU)																				
Provide centralized analytic processing and training																				
Develop biological standards (new strains as needed in out years)																				
Develop Standard Operating Procedures for algal sampling and lipid quantification																				
Purchase and Install Equipment (NMSU)																				
Continuous flow hydrothermal reaction system (1-L, 0-400 C, 0-400 bar)																				
Components, fabrication and utility modification costs for 24 Outdoor Algae Cultivation Systems																				
Harvesting System (Evodos, Origin Oil or dissolved air floatation (DAF))																				
Purchase and Install Equipment (ENMU)																				
Algae turf scrubber																				
Small-scale Experimental Ecological Design Facility (SEED) (UNM)																				
Provide Overall Project Support																				
High frequency chemical analyses																				
Flexible cultivation environments																				
Stable isotope measurements																				
Purchase and Install Equipment (UNM, NMC)																				
Waters UPC2																				
Water Fraction Collector & HP/Agileat 350																				
Digital compound microscope																				
Photobioreactors																				
GC/MS																				
MIMS																				
Isotopic laser																				
Hyperspectral imaging upgrades																				
Photochemical reactor																				
Personnel (All)																				
Form collaborations in NM among groups working on algal cultivation and wastewater management																				
Develop Mentoring and Training Plan																				
Hire new faculty in engineering																				
Hire research technician to run UPC2																				
UNM/NMC student support (1 per year)																				
UNM student support (2.5 per year)																				
NMSU Faculty hire																				
NMSU student hires																				
ENMU entry-level technician hire																				
ENMU student hire																				

Solar Energy (2)	Year 1				Year 2				Year 3				Year 4				Year 5			
1: June-Aug; 2: Sept-Nov; 3: Dec-Feb; 4: Mar-May	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Build solar team (All)																				
Hire/train graduate students																				
Identify team member at NMSU																				
Hire physical or inorganic chemist																				
Incorporate new team member's expertise (NMT, NMSU)																				
2. Purchase and install equipment (NMT, UNM)																				
MCD Magnet System																				
Time Resolved Spectroscopy																				
Fluorolog spectrophotometer																				
Raman Microscopy																				
Steady State Fluorescence Spectrometer (UNM) (Added in year 4)																				
Gas Chromatog (Added in year 4)																				
3. Use nanoparticle ZnS to catalyze reduction of CO2 (NMT, UNM, NMHU, NMSU)																				
Obtain preliminary data on ZnS NPs vs. microparticle																				
Explore and develop dye photosensitizers for ZnS catalysts																				
Investigate semiconductor catalysts MoS																				
Obtain spectroscopic characterization of NP catalysts																				
Collaborate with junior faculty on solar fuel plasmonics (Added in year 4)																				
Initiate new directions toward Methanol fuel (Added in year 4)																				
4. Develop stable BHJs from a single polymer system (NMT, UNM, NMHU, NMSU)																				
Synthesis of new polymeric systems and characterization																				
Incorporate non-covalent guests/C60 porphyrins																				
Spectroscopic characterization / fluorescence lifetime																				
9. Connections between EPSCoR teams (NMT, SFI, UNM, NMHU, NMSU)																				
Outreach to K-12 students via SFI/GUTC																				
Explore collaboration w/ geoscientist for zeolite carbon capture																				
Explore collaboration w/ biologist using bioalgal carbon capture																				

Osmotic Power (3)	Year 1				Year 2				Year 3				Year 4				Year 5			
1: June-Aug; 2: Sept-Nov; 3: Dec-Feb; 4: Mar-May	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Purchase and install equipment (major pieces) (NMT)																				
Membrane Osmometer																				
Pressure Retarded Osmosis (PRO) System																				
SEM-EDS																				
Research																				
Identify potential sources of produced water (NMT, UNM)																				
Characterize the compositions of source waters (NMSU, ENMU)																				
Evaluate the achievable trans-membrane pressures (NMT, UNM)																				
Assess the design requirements of membranes and membrane modules (All)																				
Design, construct, and modify bench-scale osmotic power systems (All)																				
Develop new thin film composite (TFC) membranes and modules to maximize power generation (NMT, NMHU)																				
Investigate the occurrence, prevention, and mitigation of membrane fouling (All)																				
Perform cost-benefit analysis (NMT)																				
Personnel																				
Develop Mentoring and Training Plan (All)																				
Hire/train graduate students (NMT)																				
Hire/train post-docs (NMT)																				
Hire/train research chemist (NMSU)																				


KEY
On track
Behind schedule
Complete
Ahead of schedule
Deleted or changed
Unreported
Uranium (4)
Year 1
Year 2
Year 3
Year 4
Year 5
1: June-Aug; 2: Sept-Nov; 3: Dec-Feb; 4: Mar-May
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
Purchase and install equipment (major pieces)
ICP-MS (NMT)
Microwave digestion system (NMT)
FFF (NMT)
HPLC Upgrades (NMT)
Research
Plan for CI needs (All)
Develop and apply methodologies for rapid, sensitive measurement of U speciation (NMT, UNM)
Examine the kinetic stability of bio-reduced monomeric and colloidal U(IV) species in solution under anoxic and suboxic conditions (UNM, NMT)
Examine the effects of microbial activities on chemical speciation and mobility of U and related contaminants
Develop and test novel technologies for U remediation & de-mobilization (UNM, NMT)
Locate and characterize a site to study groundwater contamination (UNM, NMT)
Assess, delineate, and predict potential in situ mining impacts as well as contaminant plumes from legacy mining operations (UNM, NMT)
Perform field-scale mapping and modeling of subsurface U mobility at the field site (UNM, NMT)
Evaluate the potential roles of wind-born dust and animal (or human) vectors in the arid tribal lands ~~of the Diné reservation~~ (NMT, UNM)
Source characterization (UNM, NMT) (Added in year 4)
Develop collaborations with the Navajo Nation, Laguna Pueblo, and Sandia National Labs (UNM, NMT)
Education and outreach program for Navajo and Puebloan students on the reservation (NMT, UNM)
Personnel
Develop Mentoring and Training Plan
Hire/train graduate students (UNM, NMT)

Geothermal Energy (5)	Year 1				Year 2				Year 3				Year 4				Year 5			
1: June-Aug; 2: Sept-Nov; 3: Dec-Feb; 4: Mar-May	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Personnel and collaborations																				
Develop Mentoring and Training Plan																				
Recruit students for yrs. 2 & 4 (UNM, NMT)																				
Develop recruiting brochure (UNM, NMT)																				
Explore wider collaborations across institutions and tribes (UNM, NMT)																				
Develop partnerships with private sector, governmental agencies, and national labs (NMT, UNM)																				
Hire/train graduate students																				
Develop outreach and educational materials (NMT, UNM)																				
Engage with Geothermal Resources Council (NMT, UNM)																				
Develop IWGs for geothermal (UNM, NMT)																				
Purchase and install equipment (major pieces)																				
Magneto-telluric system (NMT)																				
Visualization work stations (NMT)																				
Autonomous sensors/field mass spectrometers (UNM)																				
Research																				
Select geothermal systems in New Mexico for analysis (NMT, UNM)																				
Characterize the compositions of waters and gases in these systems using published and new data (UNM, NMT)																				
Assess influence of geothermal systems and systems development on potable water quality (UNM)																				
Measure the magneto-telluric signature and resistivity of the subsurface below the targeted areas (NMT)																				
Determine the temperature of these systems using published and new data and develop new techniques to determine temperatures (NMT, UNM)																				
Determine radiometric dates of geothermal deposits and fault systems (UNM, NMT)																				
Add new data to existing databases and link to other databases (NMT)																				
Make 2D geologic cross sections, 3D geologic block diagrams, and 2D and 3D conceptual model system (NMT, UNM)																				
Develop high performance 2D and 3D hydrothermal computer models (NMT, UNM)																				
Model sustainability of geothermal production over several decades (NMT, UNM)																				
Evaluate & categorize thermal energy in place and potential power sources (NMT, UNM)																				

Social & Natural Science Nexus (6)	Year 1				Year 2				Year 3				Year 4				Year 5			
1: June-Aug; 2: Sept-Nov; 3: Dec-Feb; 4: Mar-May	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Build an SD infrastructure to integrate social and natural sciences by developing energy, socioeconomic and water budgets (All)																				
Create an infrastructure to collect and use human perceptions data (UNM)																				
Develop experimental data and experimental protocols to help fill data gaps on human perceptions and choices																				
Develop and administer an initial statewide survey to provide baseline data on attitudes about energy/water issues																				
Develop a statewide dynamic water budget that is linkable through the SD model to other science and social data models (NMSU)																				
Merge existing and new water resource data to establish dynamic water budgets that researchers and policymakers can access when they need integrated current status water budgets (NMSU)																				
~~Develop statewide and regional modules (as applicable) and a statewide model that crosses disciplines, incorporating modules from disparate fields into a decision support system designed with flexible scale and focus (All)~~																				
Develop mixed statewide and regional model components that combine energy, water, and public perceptions data (Added in year 4)																				
Assemble team for data integration and modeling workshops with the CI team and for research team meetings and visits to data repositories (All)																				
Develop database of existing data sources, including socioeconomic, water, energy, legal, environmental, and physical infrastructure (All)																				
Reach out to state agencies that can contribute to the model's relevance, the utilization of our products, and future research (All)																				
Collaborate across EPSCoR research teams to integrate research into database and integrated decision support system (All)																				
Enhance collaboration with policymakers and stakeholders (All)																				
Develop Mentoring and Training Plan																				
Hire/train graduate students (UNM, NMSU)																				
Hire/train post-docs (NMSU)																				

Diversity (7)	Year 1				Year 2				Year 3				Year 4				Year 5			
1: June-Aug; 2: Sept-Nov; 3: Dec-Feb; 4: Mar-May	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Hire Diversity Coordinator																				
Complete researcher mentoring plans																				
Diversity IWG																				
Project leadership attends SACNAS/AISES																				
Attend NM LSAMP Student Research Conference																				
Gather project diversity data; report at All Hands Meeting																				

Workforce Development (8)	Year 1				Year 2				Year 3				Year 4				Year 5			
1: June-Aug; 2: Sept-Nov; 3: Dec-Feb; 4: Mar-May	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
GUTC Curriculum Units																				
GUTC Summer Professional Development Workshop (5 days)																				
GUTC Fall Professional Development Workshop (1 day)																				
GUTC Spring Professional Development Workshop (1 day)																				
GUTC Club meeting (13 weeks per semester)																				
GUTC in-school computational thinking (5 students/5 teachers) (Added in Year 3)																				
Career Connections Conferences																				
Student Roundtables																				
STEMAP web materials developed																				
STEMAP recruitment at PUIs																				
STEMAP summer program																				
STEMAP quarterly webinars																				
Externship program guidelines/application																				
Recruit & select externship students/labs																				
5 graduate students placed in externships																				
Post-doc workshop (4 days)																				
PUI Faculty Leadership and PD Institute																				
Online follow-up learning sessions for PUI faculty																				
Form four colleague research teams (CC/ Univ. Researchers)																				
Training for Undergraduate Faculty Institutional Coordinators (FIC)																				
Create/update ICCE curriculum																				
Host ICCE																				
Host ICCE Fellows in New Mexico																				
On-going ICCE Fellows support/mentoring																				

Cyberinfrastructure (9)	Year 1				Year 2				Year 3				Year 4				Year 5			
1: June-Aug; 2: Sept-Nov; 3: Dec-Feb; 4: Mar-May	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Develop Mentoring and Training Plan																				
Integrated Data Storage and Modeling Portal (UNM)																				
Develop analytic services and client interfaces																				
Provide new capabilities for socioeconomic modeling and analysis																				
Ongoing data acquisition as requested to support project research																				
Expand the systems analytic capabilities																				
Document data products and integrate them into portal																				
Include an education resources section																				
Evolve the current XML document-based data documentation model																				
Modify component services that deliver ISO metadata (Semantic-enabled)																				
Expanding Our Interoperability with National and International Data Networks (UNM)																				
Continue the Western Consortium CI Working Group																				
Expand support for web service protocols used by networks																				
Connect to external geospacial platforms																				
Register project data products with international and national registries																				
Add project data products to LoboVault																				
Enhancing Tools for Collaboration (UNM)																				
Develop next generation data-centered collaboration capabilities																				
Support an online lab notebook system																				

KEY	On track	Behind schedule	Complete	Ahead of schedule	Deleted or changed	Unreported

External Engagement (10)	Year 1				Year 2				Year 3				Year 4				Year 5			
1: June-Aug; 2: Sept-Nov; 3: Dec-Feb; 4: Mar-May	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
ISE Net Annual Metting																				
Researcher/ISE Meetings																				
ISE Regional meetings																				
Award museum programming mini grants																				
Exhibit front-end study																				
NMMNHS Exhibit planning and opening																				
¡Explora! Exhibit planning and opening																				
NMNSH Exhibit planning and opening																				
Town Hall																				
EPSCoR Annual Report (public)																				
NM EPSCoR Website revised/updated																				

Evaluation and Assessment (11)	Year 1				Year 2				Year 3				Year 4				Year 5			
1: June-Aug; 2: Sept-Nov; 3: Dec-Feb; 4: Mar-May	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Finalize Evaluation & Assessment (E&A) plan																				
Collect baseline data																				
External E&A Report																				
External Advisory Board meeting																				
AAAS Review																				
Exhibit evaluation																				

KEY	On track	Behind schedule	Complete	Ahead of schedule	Deleted or changed	Unreported

Sustainability (12)	**Year 1**				**Year 2**				**Year 3**				**Year 4**				**Year 5**			
1: June-Aug; 2: Sept-Nov; 3: Dec-Feb; 4: Mar-May	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
New faculty hires (4)																				
Teacher PD ~~(Exploratorium)~~																				
ISE-led teacher workshops																				
Follow-up teacher PD																				
NSF Day																				
I-IWGs (3/year)																				
Seed Awards																				

Management (13)	**Year 1**				**Year 2**				**Year 3**				**Year 4**				**Year 5**			
1: June-Aug; 2: Sept-Nov; 3: Dec-Feb; 4: Mar-May	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Strategic Plan development and review																				
Subaward fiscal training including Yr. 5 closeout																				
Component budget review																				
Annual CUP presentation																				
State Committee meetings																				
Campus visits (1/quarter)																				
Reverse site visit (estimated)																				
Annual reporting																				
Monthly team meetings																				
Quarterly collaboration meetings (2 teams/ quarter)																				
Quarterly Management Team meetings																				
All Hands Meeting																				