

MBNMS Agriculture Water Quality Program

Increasing agriculture sustainability while improving water quality entering the Marine Sanctuary

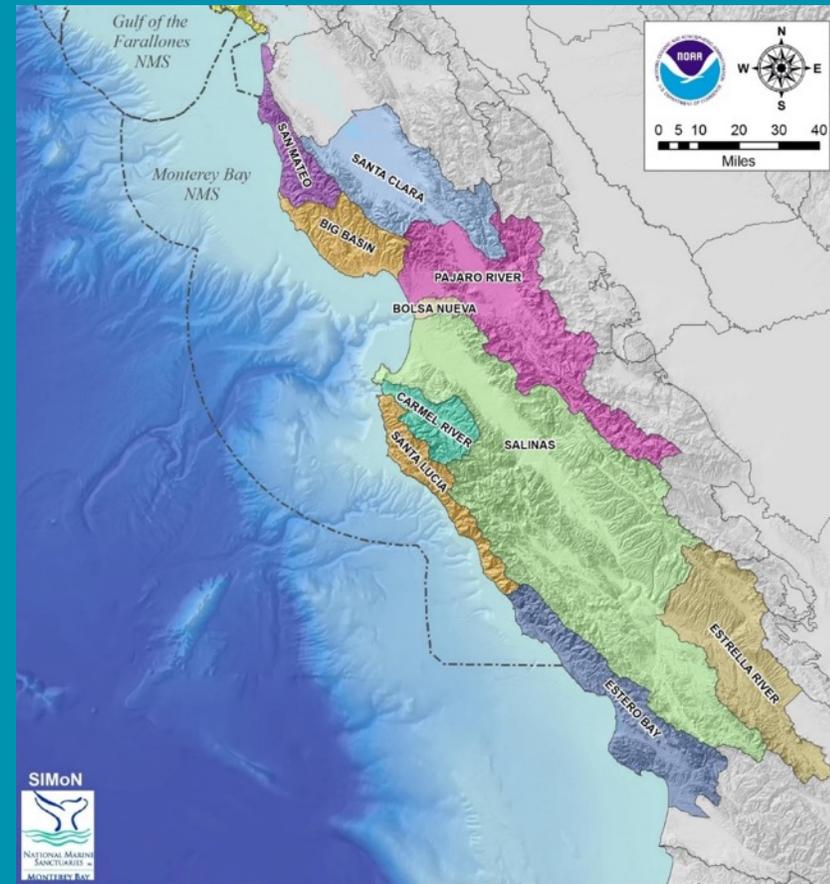


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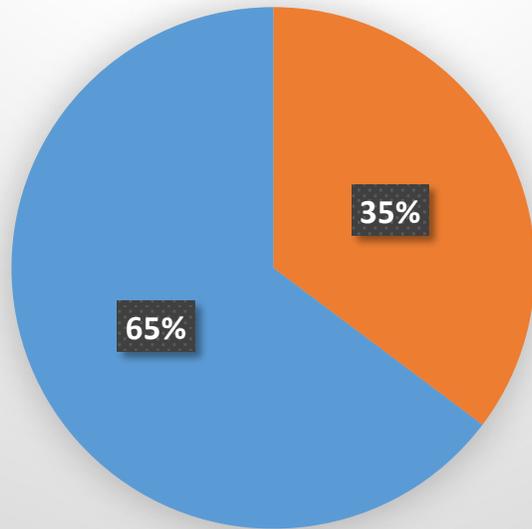
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Agriculture's Importance in the Region

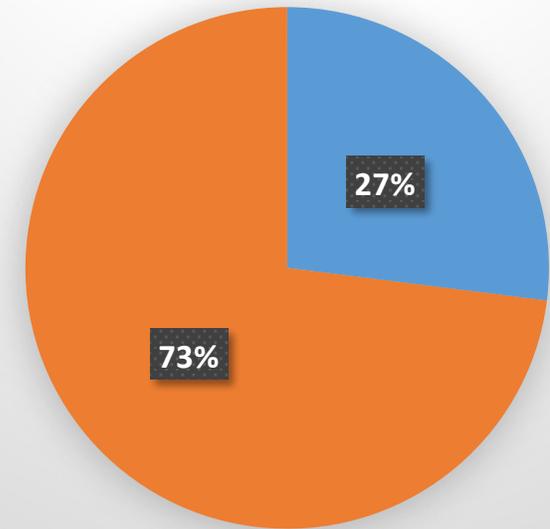
Resource Usage

Land Use

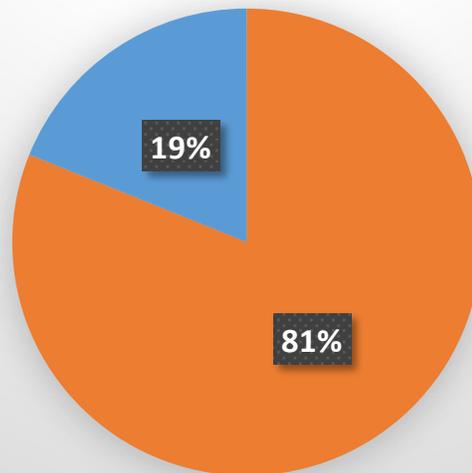


 Agriculture
 Other

Jobs



Water Use



Agriculture's Importance in the Region

Values and Benefits

Benefits

Food for the Nation

Beautiful Open Space

Wildlife Corridors

Bio Diversity

GHG Sequestration Potential

Employment

Income and Revenues

(research, equipment, seed,
restaurant, tech service etc.)



Program Core Objectives



Improve Water Quality Entering Monterey Bay National Marine Sanctuary from/ with agriculture

Collaborate and Partner with researchers, technical service providers, growers, ranchers and other stakeholders – sharing understanding.

Increase sustainability of agriculture in the region through participating in strategic programs, eg CalCAN, Pajaro Compass, EcoFarm Steering Committee, Mry Co Sustainability Working Group.

Improving Water Quality



Nutrients



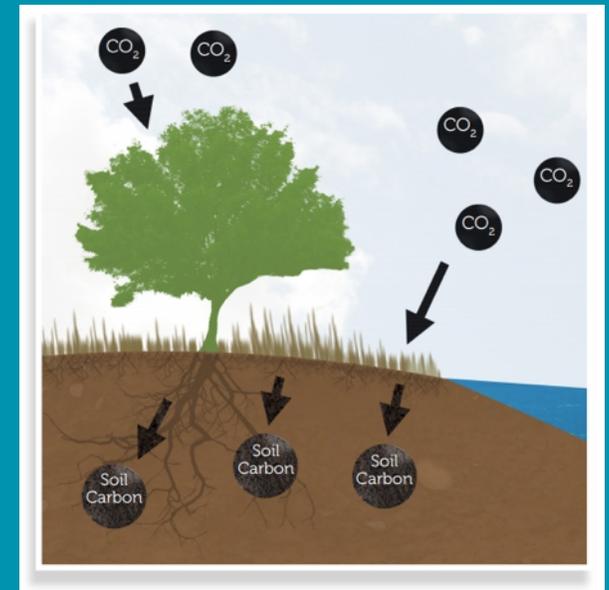
Plastic



Pesticides



Carbon Farming



Nutrient Threats to MBNMS

Nutrient Sources

- Upwelling from Marine Canyon
- Rivers carrying Ag & Urban Runoff
- Waste Water Treatment Facility Discharges

Excess Nutrients increase Harmful Algal Blooms (HAB):

- Sea otters (11) in Monterey Bay died from microcystin in 2007.
- Four MBNMS watersheds (Big Basin, Salinas, Pajaro, Carmel) identified in 2010 with high microcystin.
- 2007 HAB bloom produced surfactants that coated birds, affecting 14 species and at least 750 birds

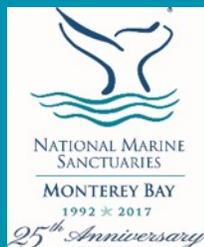
Excess Nutrients lead to Eutrophication (diminished oxygen availability)

- Elkhorn Slough is has large areas affected by low oxygen - causing reduced clams, oysters and fish.
- Excess pickleweed and ecosystem changes in fish nursery habitat



Algal Bloom at Moro Cojo when Wetland Turned off

Nutrients Management Partners and Collaborators



Sea Mist Farms
Pajaro Valley Laser Leveling
Moss Landing Marine Lab
California Ecological Analytics
Dayton Biological
California Department of Water Resources
Monterey Co. Water Resources Agency
RDO Irrigation
Ecological Analytics
Dayton Biological
Watsonville Wetlands Watch
Elkhorn Native Plant Nursery
Elkhorn Slough Foundation
CCC Watershed Stewards Program
Tailwater Systems Inc.
Central Coast Regional Water Quality Control Board
DOLE
Stockman's Energy
Ag Land Trust
CA Department of Water Resources:
Monterey Bay Analytical Services
Central Coast Water Quality Preservation Inc

Actions to Reduce Nutrients & Improve Water Quality

Irrigation and Nutrient Management: Projects, Education, Field Evaluations
Prop 84 Grant:



Actions to Improving Water Quality & Ag Sustainability with Partners & Collaborators

Nutrients

Santa Rita Creek
Integrated Regional
Water Management
Program

Field Events and Visits to
Innovative Systems and
Practices



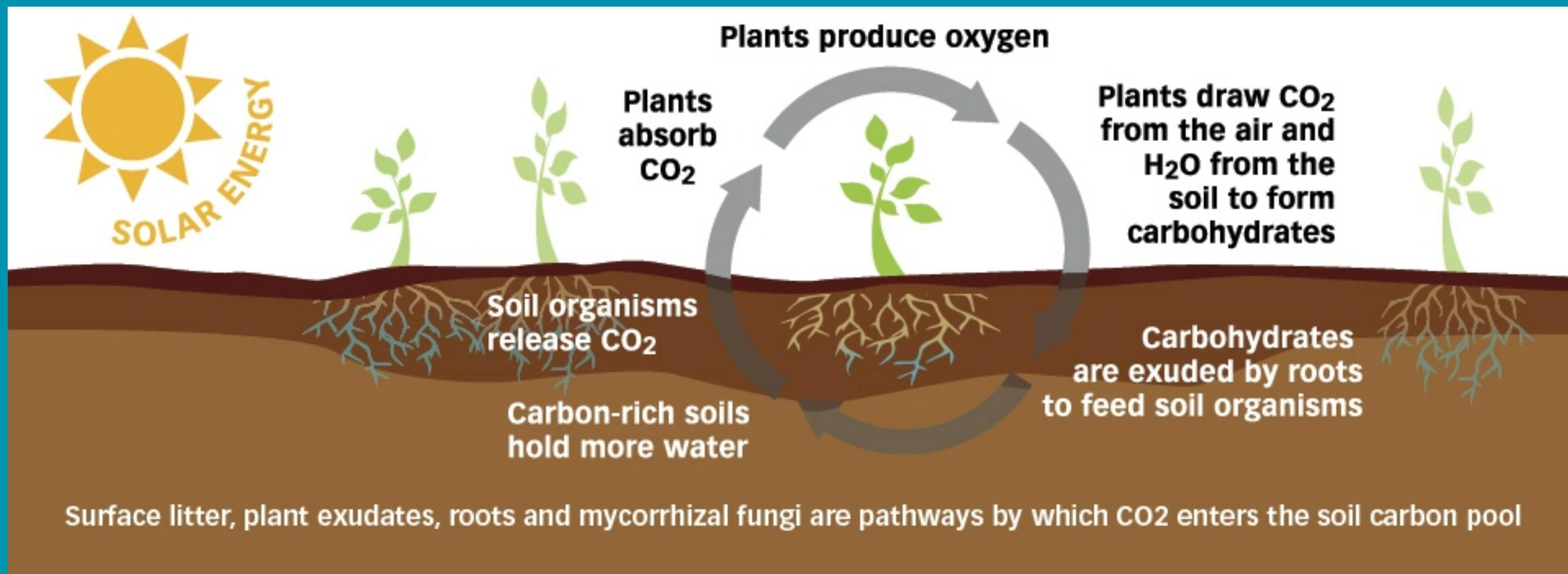
CIG Grant: Watershed Focused Approach

USDA Natural Resources
Conservation Service grant:
Conservation Innovation Grant
(CIG Grant)



Carbon Farming

Improving Ocean Water Quality by CO₂ Sequestration



Carbon Farming

Ocean Changes with Temperature Increases



Physical:

Warming
Changing
Currents
Sea Level Rise
Weather
Extremes

Chemical

Acidification
Stratification
Hypoxia
Calcium
Carbonate

Biological/ Ecosystem

Adaptation
Movement
Mortality
Ecosystem
Change

Social/ Economic

Resources
Extreme Weather
Employment
Health Risks
Shoreline Loss

Carbon Farming

Practices Proven to Sequester Carbon and Improve Soil Health

Cropland Mangement:

- Reduced Tillage
- Cover Crops
- Mulching
- Compost Application
- Nutrient management
- Strip cropping

Woody Cover:

- Hedgerow Planting
- Riparian Forest Buffer
- Windbreak Establishment
- Multi-Story Cropping



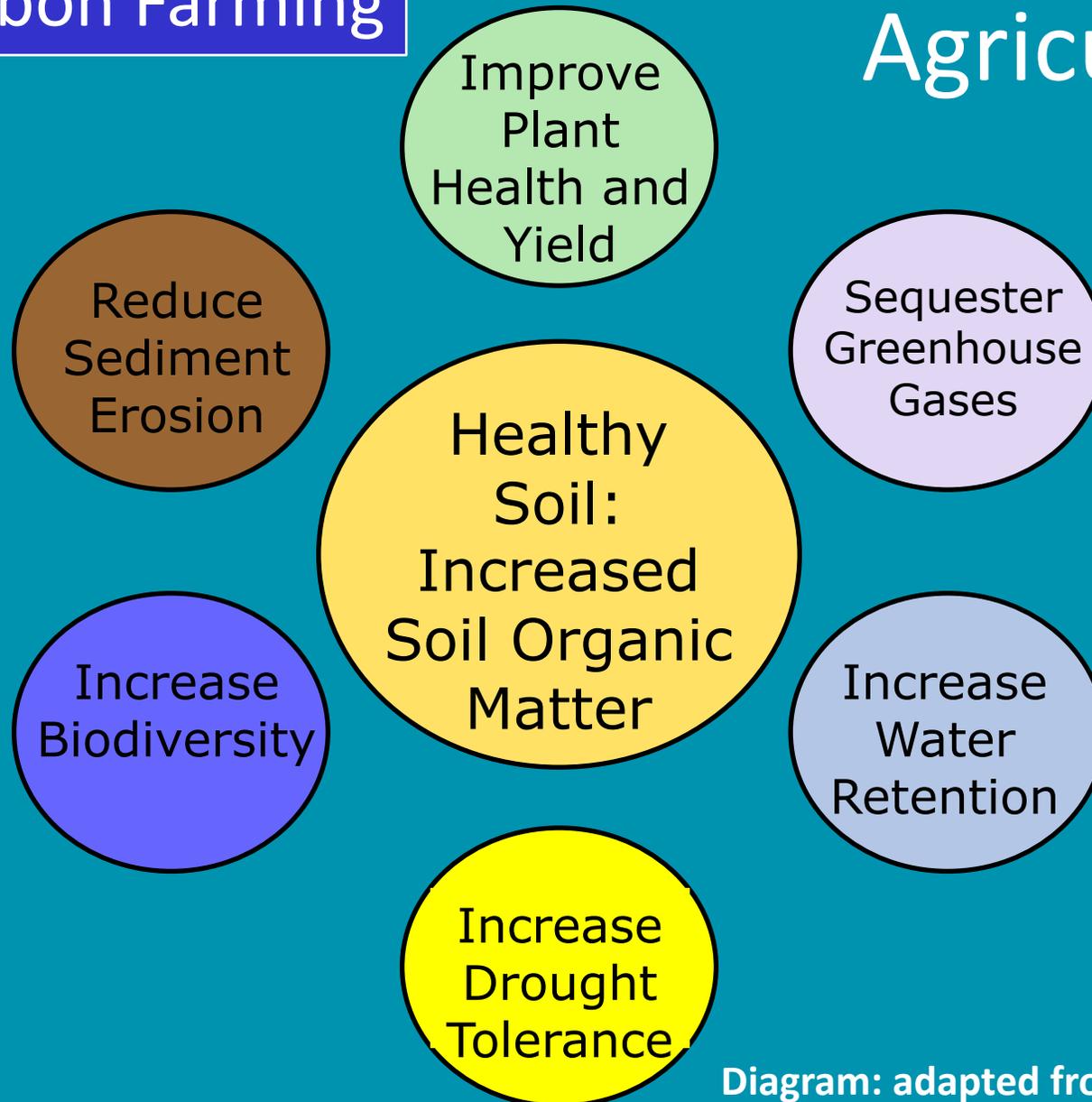
Grazing Land Practices:

- Prescribed Grazing
- Range Planting
- Silvopasture
- Nutrient Management
- Compost Application

Herbaceous Cover:

- Buffer Strips
- Grassed waterway
- Field border
- Filter strip
- Vegetative Barrier

Carbon Farming



Agriculture Sustainability

- A 1% increase in Soil Organic Matter to 1 foot depth stores 70,000 gallons per acre.
- Sediment erosion is one of the primary threats to agricultural sustainability. (NRCS)

Diagram: adapted from CDFA California Healthy Soils Fact Sheet

Carbon Farming

Healthy Soils Program CDFA Grant



Carbon Storage into Working ranchlands raising pigs, goats, sheep and chickens in Sanctuary watersheds



Sequestration on 2 Ranches:
62 metric tons per year GHG
EQUALS



13.5 cars

OR



16 CA houses



Carbon Farming on California Rangeland

Management Practice applied to 10% of CA's rangeland

Sequestration Potential (Million Tons CO₂/ yr)

Seeding forages to improve rangeland condition

2

Compost Application to Grazed Land

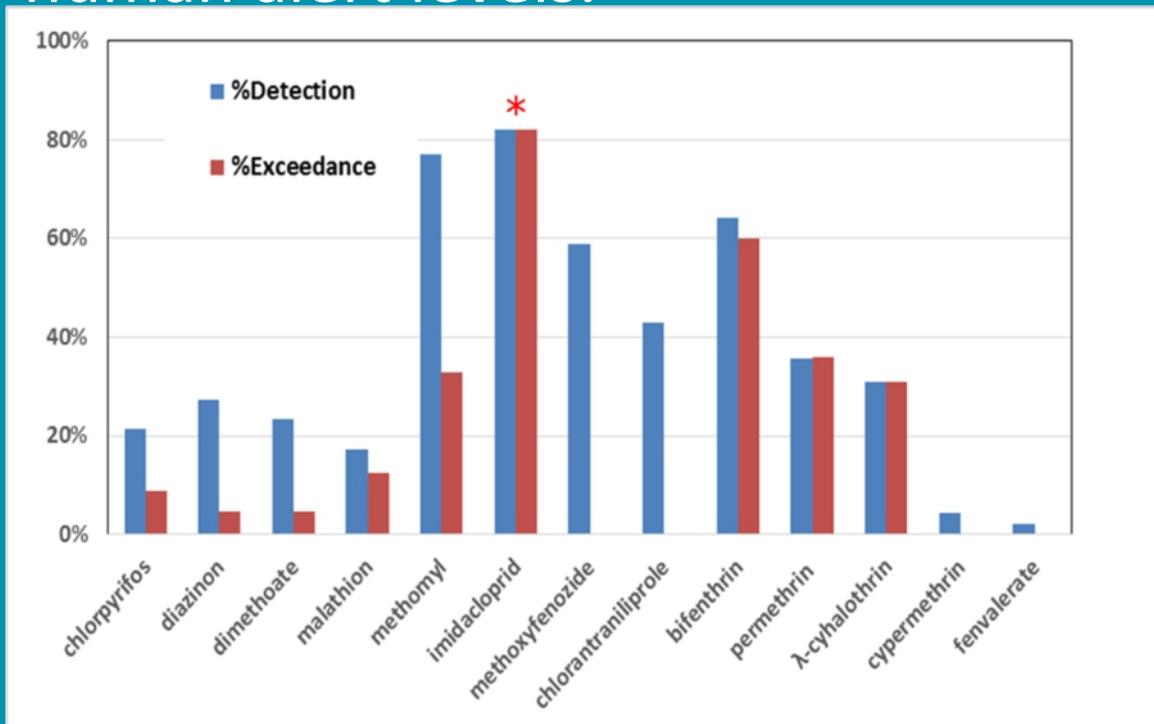
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Equivalent to total CA Residential GHG Production



Pesticide Threats to MBNMS

Legacy pesticides (DDT, chlordane and dieldrin) continue to be detected in the Pajaro & San Lorenzo Rivers (and other major rivers) and the open ocean. Concentrations found in mussels in 2017 at the Hook exceeded “human alert levels.”



Many different current use pesticides are detected in Salinas fresh waterbodies by CA Department of Pesticide Regulations. (2011 – 2016 summary). Little monitoring occurs in the open ocean.

Pesticide Threats to MBNMS

Eggshell thinning and lower hatching success of California Condors due to DDT continues on the Central Coast. DDT comes from feeding on sea lions.



The origin of the DDT could include factory discharge in the 70's as well as River discharges.

DDT continues to be found in Bottlenose Dolphins

Actions of MBNMS to Pesticide Threat

- Support Dept. of Pesticide Regulation monitoring of bioreactors.
- AWQA meeting in May 2018 to discuss pesticide monitoring results and mitigation practices: DPR, UC Davis Granite Canyon, Preservation Inc.



Goal: Prevent Plastic Movement from Field to Ocean by Water or Wind

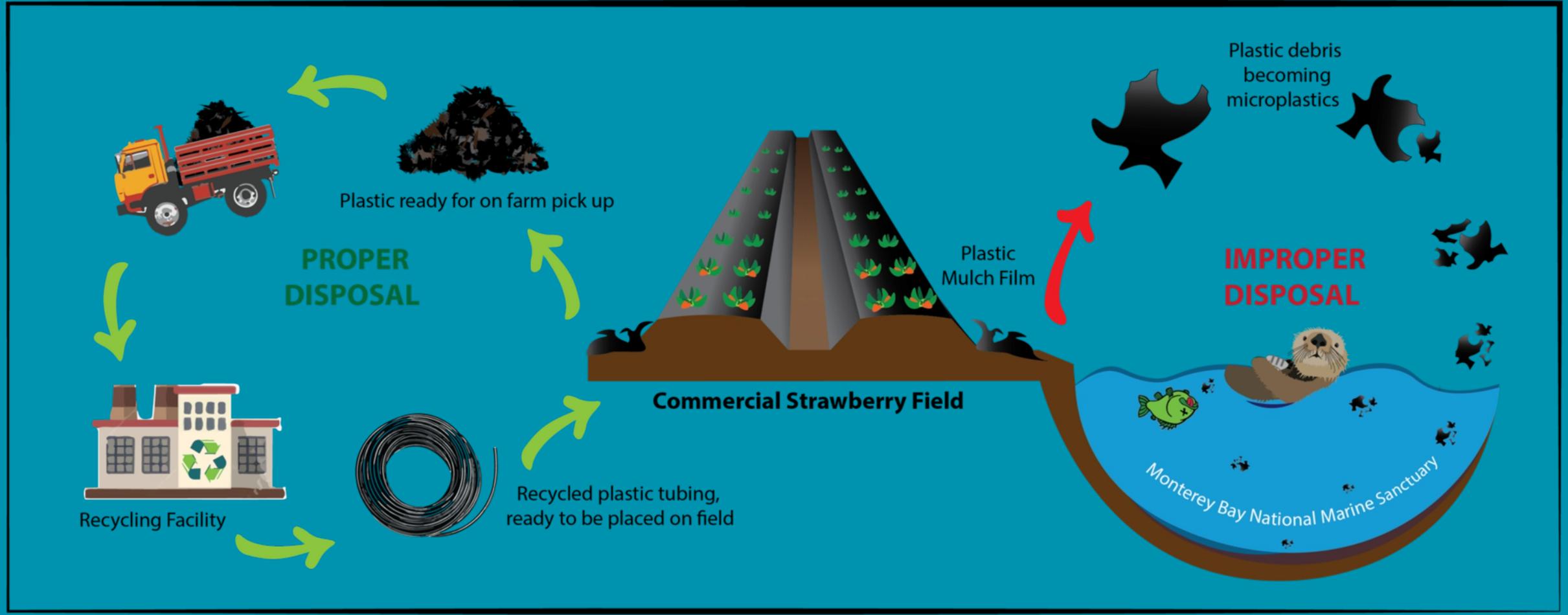
Plastic



Collaborating with CSUMB and Monterey Sustainability Working Group on macro and micro plastic and ways to resolve issues to recycling, replacement and re-use of ag plastic.

Recycling to prevent plastic entering MBNMS

Plastic:



Thank-you!
Questions??

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