TEXAS STATE
Soil & Water
CONSERVATION BOARD

BUILDING HEALTHY SOILS THROUGH PLANNING

BRIAN KOCH

TEXAS STATE SOIL & WATER CONSERVATION BOARD

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AGENCY ROLE

WATER QUALITY MANDATE - TEXAS AGRICULTURE CODE §201.026

TEXAS STATE SOIL AND WATER CONSERVATION BOARD (TSSWCB) IS THE LEAD AGENCY IN TEXAS RESPONSIBLE FOR PLANNING, IMPLEMENTING AND MANAGING PROGRAMS AND PRACTICES FOR ABATING AGRICULTURAL AND SILVICULTURAL NONPOINT SOURCE WATER POLLUTION.

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AGENCY ROLE

- PROVIDE TECHNICAL AND FINANCIAL ASSISTANCE TO LOCAL SOIL AND WATER CONSERVATION DISTRICTS
  - *LOCAL DISTRICTS ENCOURAGE LANDOWNERS AND AGRICULTURAL PRODUCERS TO VOLUNTARILY CONSERVE NATURAL RESOURCES ON THEIR PRIVATE LANDS THROUGH THE IMPLEMENTATION OF BEST MANAGEMENT PRACTICES*
- RESULTS IN A POSITIVE IMPACT ON STATE WATER RESOURCES, AND PROTECTS SOIL QUALITY WHICH SUPPORTS THE STRENGTH OF TEXAS' AGRICULTURAL ECONOMY

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HOW THIS GETS DONE

TSSWCB ADMINISTERS SEVERAL PROGRAMS TO ACHIEVE CONSERVATION GOALS ACROSS THE STATE, THEY INCLUDE:

- WATER QUALITY MANAGEMENT PLAN PROGRAM
- NONPOINT SOURCE GRANT PROGRAM
- FLOOD CONTROL PROGRAM

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SOIL HEALTH AND WATER QUALITY

A FEW REASONS WHY SOIL HEALTH PRACTICES CAN BE BENEFICIAL TO WATER QUALITY

- INCREASED WATER HOLDING CAPACITY IN THE SOIL REDUCES RUNOFF
- INCREASED PLANT VIGOR AND DEEPER ROOTS CAN INCREASE WATER INFILTRATION
- REDUCED TILLAGE AND COVER CROPS CAN HELP DECREASE EROSION (WIND AND WATER) AND DECREASED LOSSES OF NITRATE UP TO 88% AND PHOSPHOROUS UP TO 92% IN DIFFERENT STUDIES
- ADDITIONAL BENEFITS ARE POSSIBLE

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WHY HEALTHY SOIL MATTERS

HEALTHY SOIL GIVES US CLEAN AIR AND WATER, BOUNTIFUL CROPS AND FORESTS, PRODUCTIVE GRAZING LANDS, DIVERSE WILDLIFE, AND BEAUTIFUL LANDSCAPES. SOIL DOES ALL THIS BY PERFORMING FIVE ESSENTIAL FUNCTIONS:

- REGULATING WATER - SOIL HELPS CONTROL WHERE RAIN AND IRRIGATION WATER GOES. WATER AND DISSOLVED SOLIDS FLOW OVER THE LAND OR INTO AND THROUGH THE SOIL.
- SUSTAINING PLANT AND ANIMAL LIFE - THE DIVERSITY AND PRODUCTIVITY OF LIVING THINGS DEPENDS ON SOIL.
- FILTERING AND BUFFERING POTENTIAL POLLUTANTS - THE MINERALS AND MICROBES IN SOIL ARE RESPONSIBLE FOR FILTERING, BUFFERING, DEGRADING, IMMOBILIZING, AND DETOXIFYING ORGANIC AND INORGANIC MATERIALS, INCLUDING INDUSTRIAL AND MUNICIPAL BY-PRODUCTS AND ATMOSPHERIC DEPOSITS.
- CYCLING NUTRIENTS - CARBON, NITROGEN, PHOSPHORUS, AND MANY OTHER NUTRIENTS ARE STORED, TRANSFORMED, AND CYCLED IN THE SOIL.

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WHY HEALTHY SOIL MATTERS

FOR EVERY 1% INCREASE IN SOIL ORGANIC MATTER THAT RESULTS IN UP TO 25,000 GALLONS OF WATER PER ACRE INFILTRATED

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WHAT DOES A HEALTHY SOIL LOOK LIKE?

- AGGREGATED "CHOCOLATE CAKE" APPEARANCE
- USUALLY DARKER COLORED
- FULL OF LIFE (A TEASPOON OF HEALTHY SOIL CONTAINS BILLIONS OF ORGANISMS)
- MOIST BUT NEVER SATURATED APPEARANCE

WHAT DOES A HEALTHY SOIL LOOK LIKE?

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HOW WE MAKE OUR SOILS HEALTHIER

- COVER THE SOIL
- REDUCE SOIL DISTURBANCE (BIOLOGICAL, MECHANICAL AND CHEMICAL)
- KEEP PLANTS GROWING THROUGHOUT THE YEAR TO FEED THE SOIL
- DIVERSIFY AS MUCH AS POSSIBLE USING CROP ROTATION AND COVER CROPS
- INCORPORATE LIVESTOCK
- YOUR CONTEXT

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COVER THE SOIL





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MINIMIZE DISTURBANCE

MINIMIZING SOIL DISTURBANCE IS A GOOD START TO REBUILDING SOIL AGGREGATES, PORE SPACES, SOIL GLUE, AND SOIL ORGANIC MATTER. THIS IS AN ESSENTIAL STEP FOR LONG TERM SOIL PRODUCTIVITY.

SOIL DISTURBANCE CAN GENERALLY OCCUR IN DIFFERENT FORMS:

- BIOLOGICAL DISTURBANCE, SUCH AS OVERGRAZING, WHICH LIMITS THE PLANTS ABILITY TO HARVEST CO2 AND SUNLIGHT.
- CHEMICAL DISTURBANCE, SUCH AS OVER APPLICATION OF NUTRIENT AND PESTICIDE, CAN DISRUPT THE SOIL FOOD WEB FUNCTIONS.
- PHYSICAL DISTURBANCE, SUCH AS TILLAGE OR OVERUSE OF AN AREA BY LIVESTOCK, OR MOWING TOO SHORT

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MINIMIZE DISTURBANCE

- ULTIMATELY TILLAGE RESULTS IN ONE OR MORE OF THE FOLLOWING:
- WATER EROSION; TRANSPORTING SOIL, NUTRIENT, AND WATER TO OFFSITE LOCATIONS, WHICH NEGATIVELY IMPACTS WATER QUALITY AND QUANTITY.
- WIND EROSION; TRANSPORTING SOIL, AND NUTRIENT TO OFFSITE LOCATIONS, WHICH NEGATIVELY IMPACTS AIR QUALITY, HUMAN HEALTH, AND ANIMAL HEALTH.
- PONDING WATER; WHICH STAYS SATURATED ON THE SURFACE FOR LONG PERIODS OF TIME, A RESULT OF REDUCED INFILTRATION AND INCREASED RUNOFF.
- CRUSTING EASILY, WHICH RESTRICTS PLANT EMERGENCE.
- SOIL ORGANIC MATTER DEPLETION.

MINIMIZE DISTURBANCE

- TALE OF 2 SOILS OR 2 DIFFERENT MANAGEMENT PRACTICES?
- SOIL ON THE TOP: SANDY LOAM, 4 DAYS AFTER 1.5 INCH OF RAIN, CONVENTIONAL TILLAGE (DISK, PLOW, HIPPER)
- BOTTOM SOIL: HEAVY BLACK CLAY, 5 DAYS AFTER 7+ INCHES OF RAIN, NO TILL

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COMPARISON OF SOILS RELATED TO MANAGEMENT

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MAXIMIZE PLANT DIVERSITY

WE CAN START TO MIMIC THE ORIGINAL PLANT COMMUNITY BY USING CROP ROTATIONS WHICH INCLUDE ALL FOUR CROP TYPES. DIVERSE CROP ROTATIONS PROVIDE MORE BIODIVERSITY, BENEFITING THE SOIL FOOD WEB; WHICH IN TURN IMPROVES RAINFALL INFILTRATION AND NUTRIENT CYCLING, WHILE REDUCING DISEASE AND PESTS. CROP ROTATIONS CAN ALSO BE DESIGNED TO INCLUDE CROPS WHICH ARE; HIGH WATER USERS, LOW WATER USERS, TAP ROOT, FIBROUS ROOT, HIGH CARBON CROPS, LOW CARBON CROPS, LEGUMES, AND NON-LEGUMES TO NAME A FEW.

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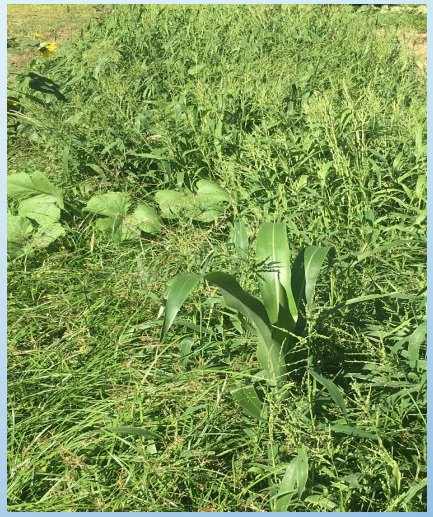
MAXIMIZE PLANT DIVERSITY



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MAINTAIN CONTINUOUS LIVING ROOTS

- PLANTS HAVE THE ABILITY TO FEED THE SOIL THROUGH PHOTOSYNTHESIS, WHICH IS BASICALLY USING THE SUN'S ENERGY TO CREATE FOOD AND MOVE IT THROUGH THE PLANT TO THE ROOTS HELPING BOOST SOIL MICROBES AND OTHER SOIL LIFE
- THIS IS WHY IT IS IMPORTANT TO MAINTAIN A LIVING ROOT OR LIVING PLANTS THROUGHOUT THE YEAR OR AS LONG AS POSSIBLE

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MAINTAIN CONTINUOUS LIVING ROOTS

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LIVESTOCK INTEGRATION

ANIMALS, PLANTS, AND SOILS HAVE PLAYED A SYNERGISTIC ROLE TOGETHER OVER TIME. IN RECENT YEARS, ANIMALS ARE PLAYING A REDUCED ROLE DUE TO BEING PLACED IN CONFINEMENT AND FEWER FARMS NOW INCLUDE LIVESTOCK AS PART OF THEIR OVERALL OPERATION.

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LIVESTOCK INTEGRATION

HOW DO WE RETURN LIVESTOCK TO THE LANDSCAPE?

- WINTER AND FALL GRAZING COVER CROPS AND ANNUAL CROP RESIDUES.
- SUMMER GRAZING A FULL SEASON COVER CROP, ALLOWING ADEQUATE PLANT RECOVERY, FOLLOWED BY A SECOND GRAZING DURING THE FALL OR WINTER.
- WINTER FEEDING ON HAYLAND FIELDS BY ROLLING OUT BALES OR BALE GRAZING.
- SEED ROTATIONAL PERENNIALS, GRAZE AND MANAGE AS PART OF THE CROP ROTATION.

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LIVESTOCK INTEGRATION

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WQMP PROGRAM HISTORY

- CREATED BY THE 73RD TEXAS LEGISLATURE IN 1993 THROUGH SENATE BILL 503 (OFTEN REFERRED TO AS 503 PROGRAM, OR 503 PLANS, OR 503 COST-SHARE)

- VOLUNTARY ENROLLMENT IN WQMP PROGRAM FOR FARMERS AND RANCHERS, EXCEPT THAT THE 77TH TEXAS LEGISLATURE IN 2001 (SENATE BILL 1339) SAID POULTRY OPERATIONS MUST OBTAIN A WQMP

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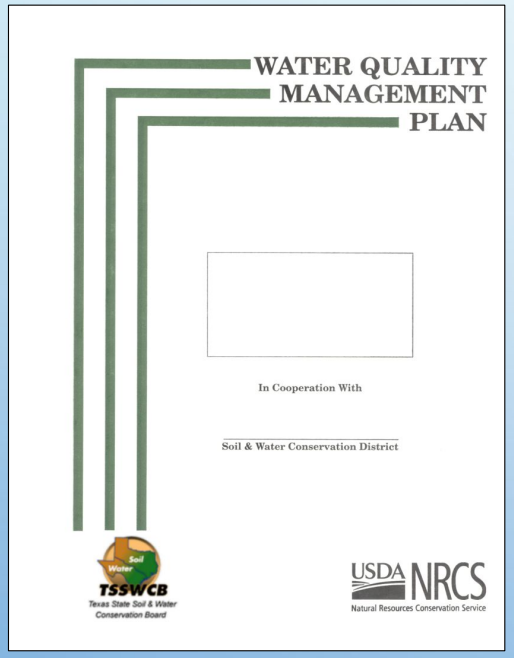
WATER QUALITY MANAGEMENT PLANS



- SITE-SPECIFIC PLAN FOR LAND IMPROVEMENT MEASURES DEVELOPED THROUGH SWCD FOR AGRICULTURAL LANDS
- PROVIDES FARMERS AND RANCHERS A VOLUNTARY OPPORTUNITY TO ACHIEVE A LEVEL OF POLLUTION PREVENTION OR ABATEMENT CONSISTENT WITH STATE WATER QUALITY STANDARDS
- INCLUDES APPROPRIATE AND ESSENTIAL LAND TREATMENT PRACTICES, PRODUCTION PRACTICES, MANAGEMENT MEASURES, OR TECHNOLOGIES APPLICABLE TO THE PLANNED LAND USE
- BEST AVAILABLE MANAGEMENT AND TECHNOLOGY AS DESCRIBED IN NRCS FIELD OFFICE TECHNICAL GUIDE

WQMPS

- COVER THE ENTIRE FARM OR RANCH
- SPECIFICALLY DESIGNED TO ACHIEVE POLLUTION PREVENTION/ABATEMENT
- TEXAS WATER CODE §26.121

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WQMPS

- SITE SPECIFIC PLANS WITH A COMBINATION OF BMPS FOR THE TREATMENT OF IDENTIFIED RESOURCE CONCERNS
- BASED ON:
  - SOIL TYPES
  - PLANNED LAND USE/PRODUCTION GOALS
  - KNOWN/POTENTIAL WATER QUALITY/NATURAL RESOURCE PROBLEMS (SWAPA)
  - OTHER SITE SPECIFIC FACTORS (TOPO, ETC.)

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TECHNICAL CRITERIA FOR WQMPS

NRCS FIELD OFFICE TECHNICAL GUIDE (FOTG)

TO VIEW ALL APPROVED PRACTICES FOR SELECTED COUNTY:

- HTTP://EFOTG.NRCS.USDA.GOV/EFOTG_LOCATOR.ASPX?MAP=TX
- SELECT REGION
- SELECT COUNTY
- SELECT SECTION IV
- SELECT A. CONSERVATION PRACTICES

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FOTG "ESSENTIAL PRACTICES" FOR EACH LAND USE:

- CROPLAND
  - CONSERVATION CROP ROTATION
  - CONSERVATION TILLAGE
- PASTURELAND
  - PRESCRIBED GRAZING
  - LIVESTOCK WATER
- RANGELAND
  - PRESCRIBED GRAZING
  - LIVESTOCK WATER
- WILDLIFE
  - WILDLIFE MGMT.
- FORESTLAND
  - FOREST MGMT.

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WQMPS ALSO INCLUDE:

- NUTRIENT MANAGEMENT
- PEST MANAGEMENT
- ANIMAL WASTE MANAGEMENT SYSTEM
- WASTE UTILIZATION
- IRRIGATION WATER MANAGEMENT

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WHY HAVE A WQMP?

- ABATE/PREVENT EROSION AND PROMOTE CONSERVATION
- A STRATEGIC "MANAGEMENT" PLAN FOR YOUR OPERATION
- "ASSURANCE" POLICY – STATE-CERTIFIED PROOF THAT YOU ARE IMPLEMENTING CONSERVATION PRACTICES
- DEMONSTRATE THAT VOLUNTARY CONSERVATION PROGRAMS PROMOTE AGRICULTURAL PRODUCTION AND ENVIRONMENTAL QUALITY AS COMPATIBLE GOALS
- DEMONSTRATE THAT AGRICULTURE IS DOING OUR PART TO PROTECT WATER QUALITY
- RESOLVE WATER QUALITY COMPLAINTS THROUGH VOLUNTARY PROCESS WITH SWCD AND TSSWCB

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WQMPS

WHAT DOES A PLAN CONTAIN?

- DISTRICT-COOPERATOR AGREEMENT
- REQUEST FOR PLANNING ASSISTANCE
- SOILS MAP & INTERPRETATIONS
- CONSERVATION PLAN MAP
- NARRATIVE RECORD OF DECISIONS (PRACTICES) NEEDED TO IMPLEMENT WQMP
- IMPLEMENTATION SCHEDULE INDICATING YEARS PRACTICES ARE TO BE APPLIED
- WORKSHEETS USED DURING THE INVENTORY AND PLANNING PROCESS OF DEVELOPING WQMP
- NRCS PRACTICE STANDARDS AND ENGINEERING DESIGNS
- SIGNATURE SHEET TO VERIFY INDIVIDUAL'S PRIVACY

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HOW TO GET A WQMP?

- AN INDIVIDUAL REQUESTS PLANNING ASSISTANCE THROUGH THEIR LOCAL SWCD
- THE WQMP IS USUALLY DEVELOPED BY THE SWCD TECHNICIAN WITH NRCS AND TSSWCB ASSISTANCE
- THE WQMP IS APPROVED BY THE LANDOWNER, THE SWCD AND NRCS AND THEN CERTIFIED BY THE TSSWCB
- PRODUCER IMPLEMENTS THE WQMP ON THEIR LAND
- ANNUAL STATUS REVIEWS ARE CONDUCTED TO ENSURE THAT THE LANDOWNER IMPLEMENTS BMPS AS AGREED TO IN THE IMPLEMENTATION SCHEDULE

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FINANCIAL ASSISTANCE

STATE (TSSWCB) OR FEDERAL (NRCS) ASSISTANCE IS OBTAINABLE FOR CERTAIN CONSERVATION PRACTICES

- TSSWCB
  - WQMP FINANCIAL ASSISTANCE (STATE)
  - CWA SECTION 319 FUNDING (FEDERAL)
- NRCS
  - FARM BILL PROGRAMS (FEDERAL)

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Questions?

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