CONSERVATION CROP ROTATION

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 328

CONSERVATION CROP ROTATION

This practice means growing various crops on the same piece of land in a planned sequence. This sequence may involve growing high residue producing crops such as corn or wheat in rotation with low residue producing crops such as vegetables or soybeans. The rotation may also involve growing forage crops in rotation with various field crops.

PRACTICE INFORMATION

The effects crop rotation have on the land varies with the soil type, crops produced, farming operations, and how the crop residue in managed. The most effective crops for soil improvement are fibrous rooted high residue producing crops such as grass and small grain. Perennial plants used for forage are very effective in crop rotations due to increases in organic matter and reduced soil erosion. In addition, crop rotations help break insect, disease and weed cycles.

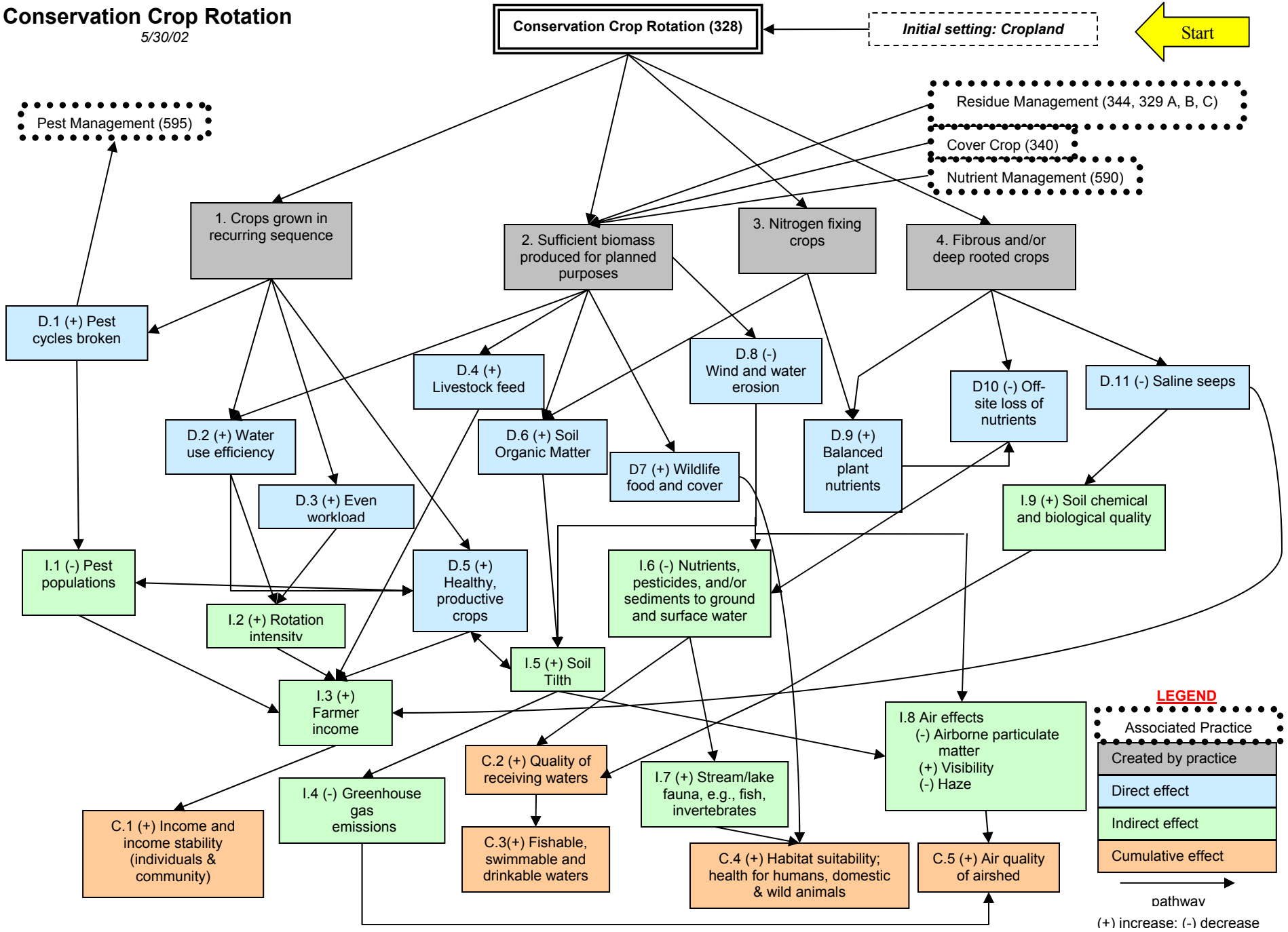
Rotations add diversity to farm operations and often reduce economic and environmental risks. Crop rotation is a low cost practice that often forms the basis for other conservation practices. Practices such as residue management, contouring, stripcropping, diversions, terraces and grassed waterways may not function properly without a planned crop rotation. Major benefits include:

1. Reduced runoff and erosion
2. Increased organic matter
3. Improved soil tilth
4. Improved pest management
5. Better moisture efficiency
6. Higher yields
7. Improved aesthetics and wildlife habitat

The following page identifies the effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Conservation Crop Rotation

5/30/02



CONTOUR BUFFER STRIPS

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 332

CONTOUR BUFFER STRIPS
Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.

PRACTICE INFORMATION
The benefits of farming on the contour with the added protection from the grass strips make contour buffer strips an effective and cost efficient conservation practice.

Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is general reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.

The practice is not well suited for undulating terrain with steep irregular slopes where contouring is impractical.

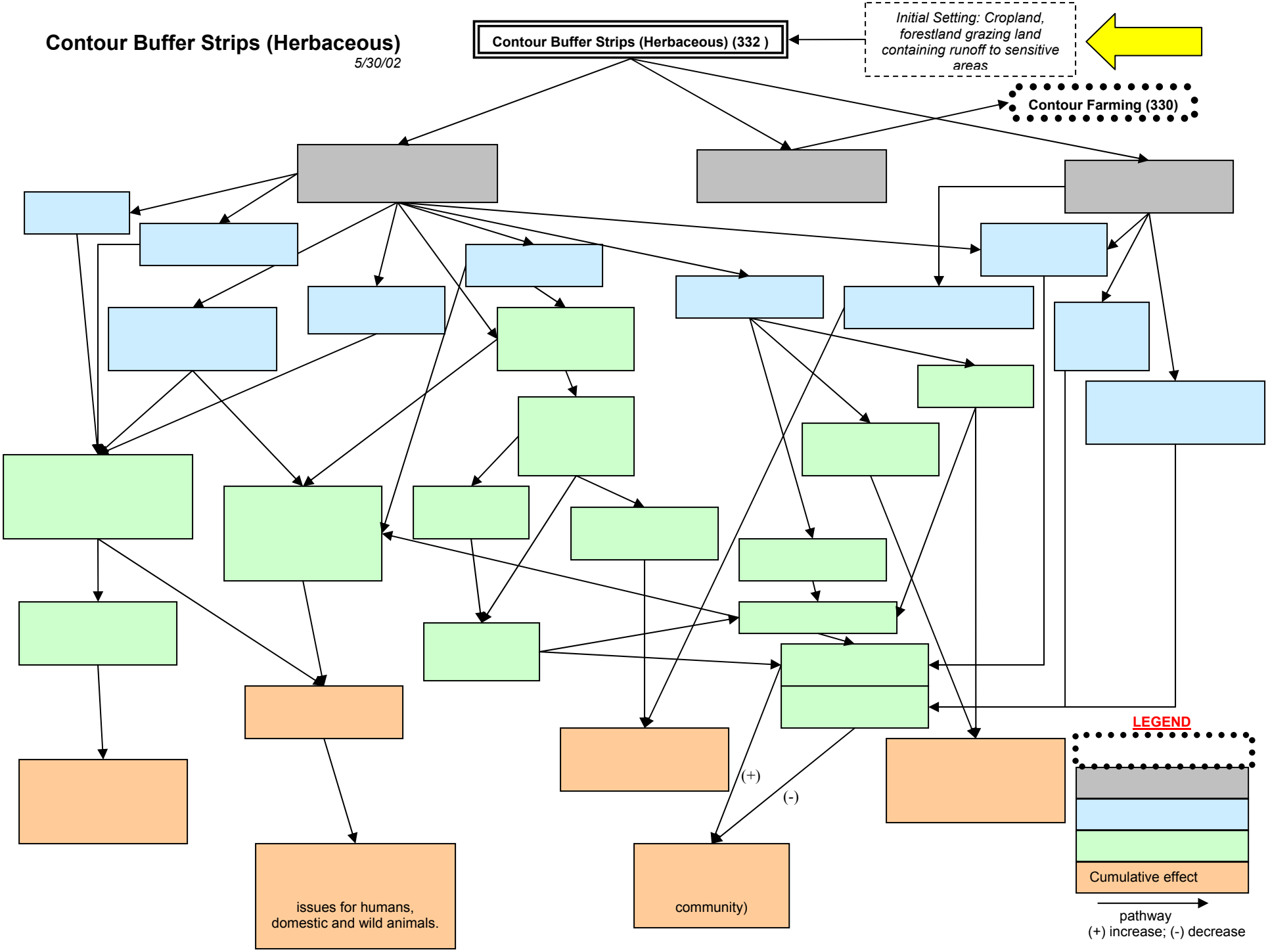
The effectiveness of contour buffer strips is dependent on several variables such as steepness, soil type, crops grown, strip widths, management, and climatic factors.

Standards and specifications containing minimum requirements, including maintenance, are included in the USDA/NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Contour Buffer Strips (Herbaceous)

5/30/02



CONTOUR FARMING

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 330

CONTOUR FARMING

Contour farming is performed on sloping cropland by following the natural contours when tilling the soil, planting, and cultivating. It also includes following established grades of terraces or diversions.

PRACTICE INFORMATION

Contour farming is a very cost effective practice when properly planned and applied.

The purpose of this practice is to reduce erosion, control runoff water, and increase moisture infiltration. Contour farming generally applies to sloping cropland but may be applicable on recreation and wildlife areas where cultural practices such as tillage and planting are used for production of special purpose crops.

Properly designed couture farming will utilize tillage marks and furrows to slow runoff and allow more moisture to infiltrate. Contour farming can increase erosion if rainfall amount exceeds the ability of the contours to remove the runoff. Therefore, this practice is usually planned in conjunction with other practices needed for support in the event runoff exceeds the carrying capacity of the contours.

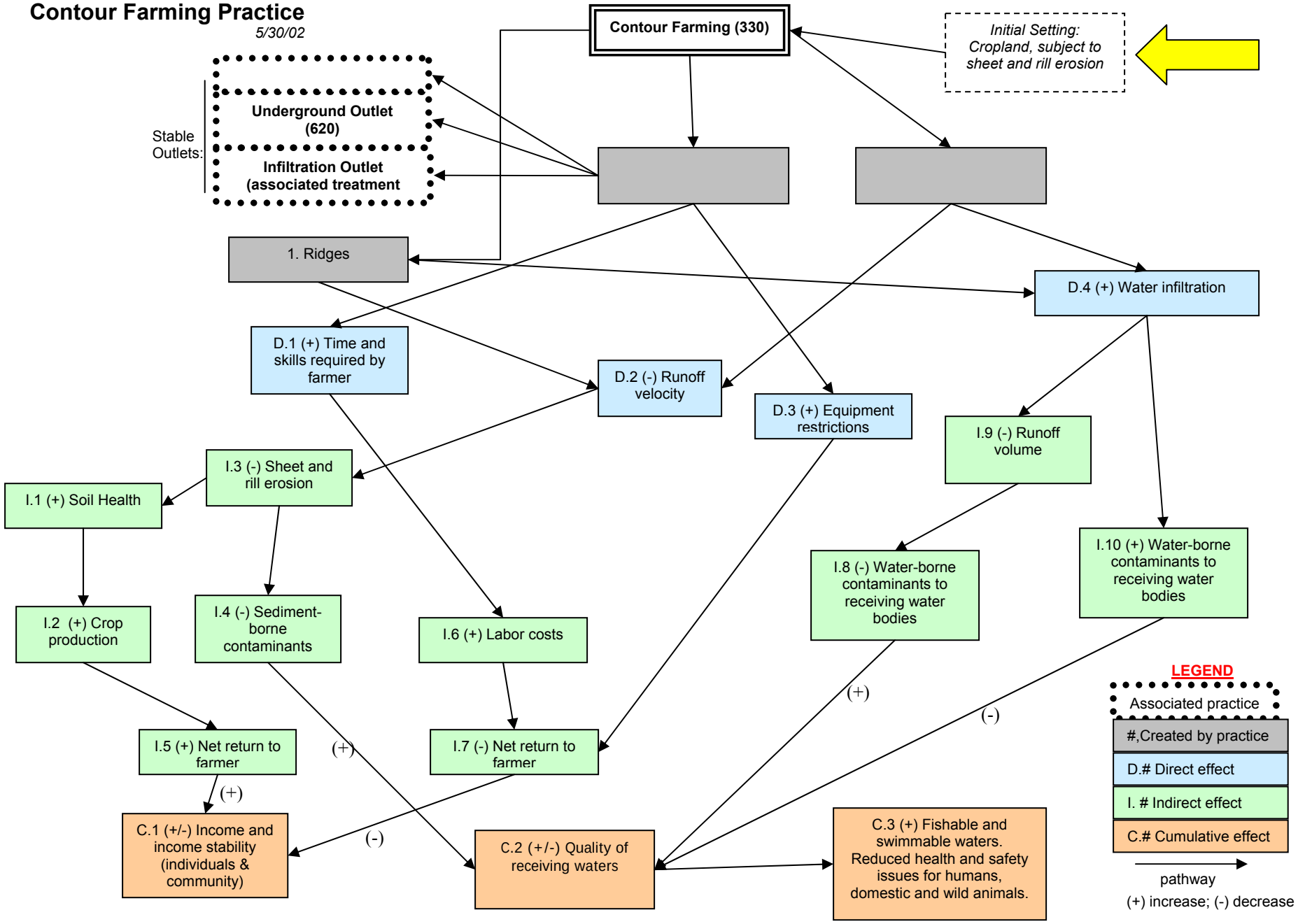
To be effective, the contours need to meet certain design criteria. Local standards and specifications generally cover the following items:

1. Alignment requirements when planned and applied with practices such as terraces, diversions, and contour strips.
2. Alignment requirements when contour farming is applied without protection from supporting practices (see above).
3. Established tolerances for deviation from true contour, row grade and row length.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Contour Farming Practice

5/30/02



COVER CROP

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 340

COVER CROP
Growing a crop of grass, small grain or legumes primarily for seasonal protection and soil improvement.

PRACTICE INFORMATION
Cover and green manure crops are grown on cropland, orchards, vineyards, and certain recreation and wildlife areas where seasonal benefits of a cover crop are needed. These crops are usually plowed under or desiccated to accommodate the primary crop being produced on the site.

This practice is used to control erosion, add fertility and organic material to the soil, improve soil tilth, and increase infiltration and aeration of the soil. In orchards, this practice is also used to increase populations of bees for pollination purposes.

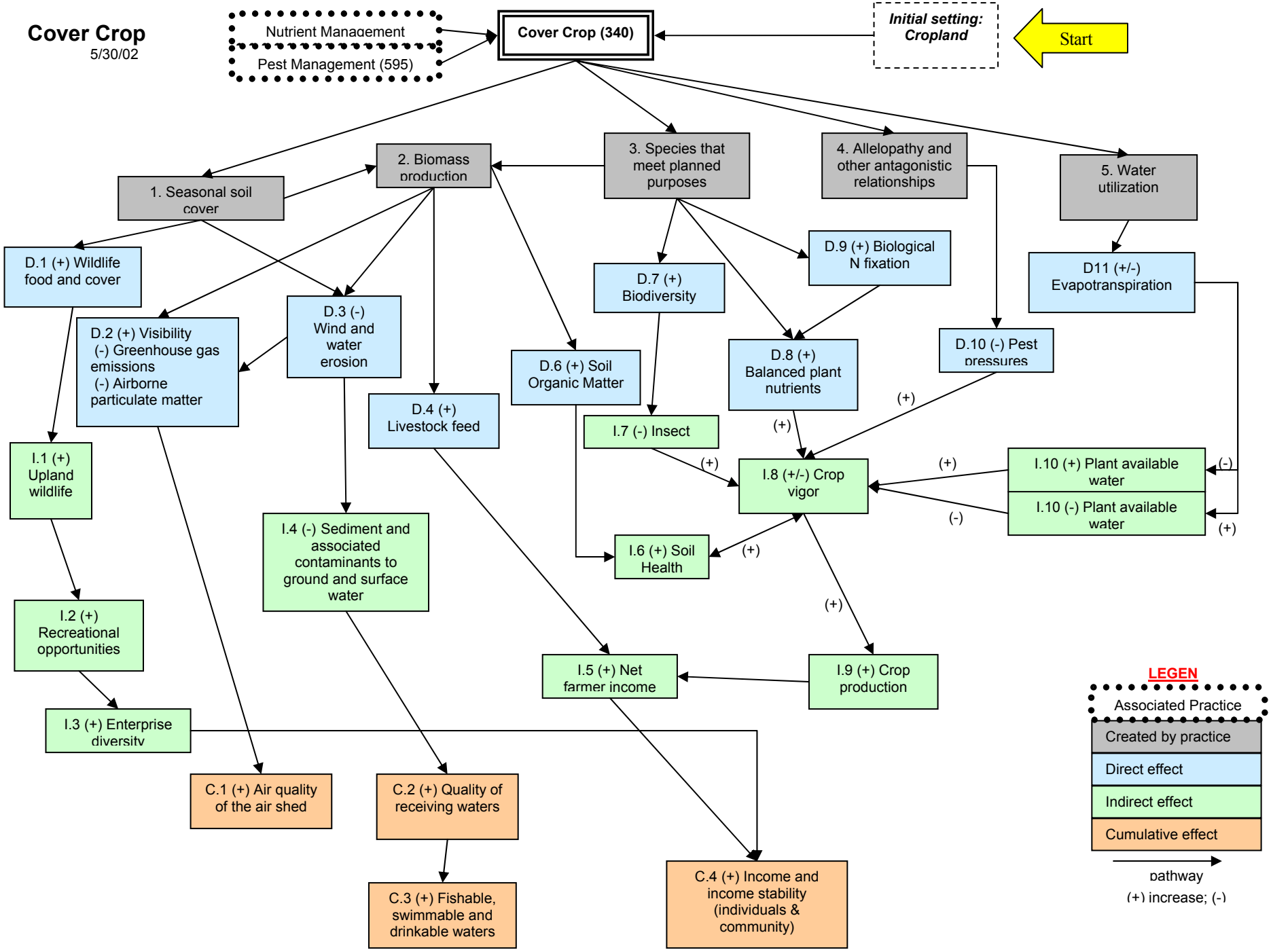
In addition, cover and green manure crops have beneficial effects on water quantity and quality. Cover crops have a filtering effect on movement of sediment, pathogens, and dissolved and sediment-attached pollutants.

Additional information including standards and specifications for establishment and management of this practice are on file in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Cover Crop

5/30/02



CRITICAL AREA PLANTING

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 342

CRITICAL AREA PLANTING
Planting vegetation on critically eroding areas that require extraordinary treatment

PRACTICE INFORMATION
This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following:

1. Dams, dikes, levees, and other construction sites with very steep slopes.
2. Mine spoil and surface mined land with poor quality soil and possibly chemical problems.
3. Agriculture land with severe gullies requiring specialized planting techniques and management.

Erosion control is the primary consideration for plant material selection. However, a broad choice of grass, trees, shrubs, and vines are usually available and adapted for most sites. Wildlife and beautification are additional considerations that influence planning decisions on a site needing this practice.

The following decisions must be made when planning this practice:

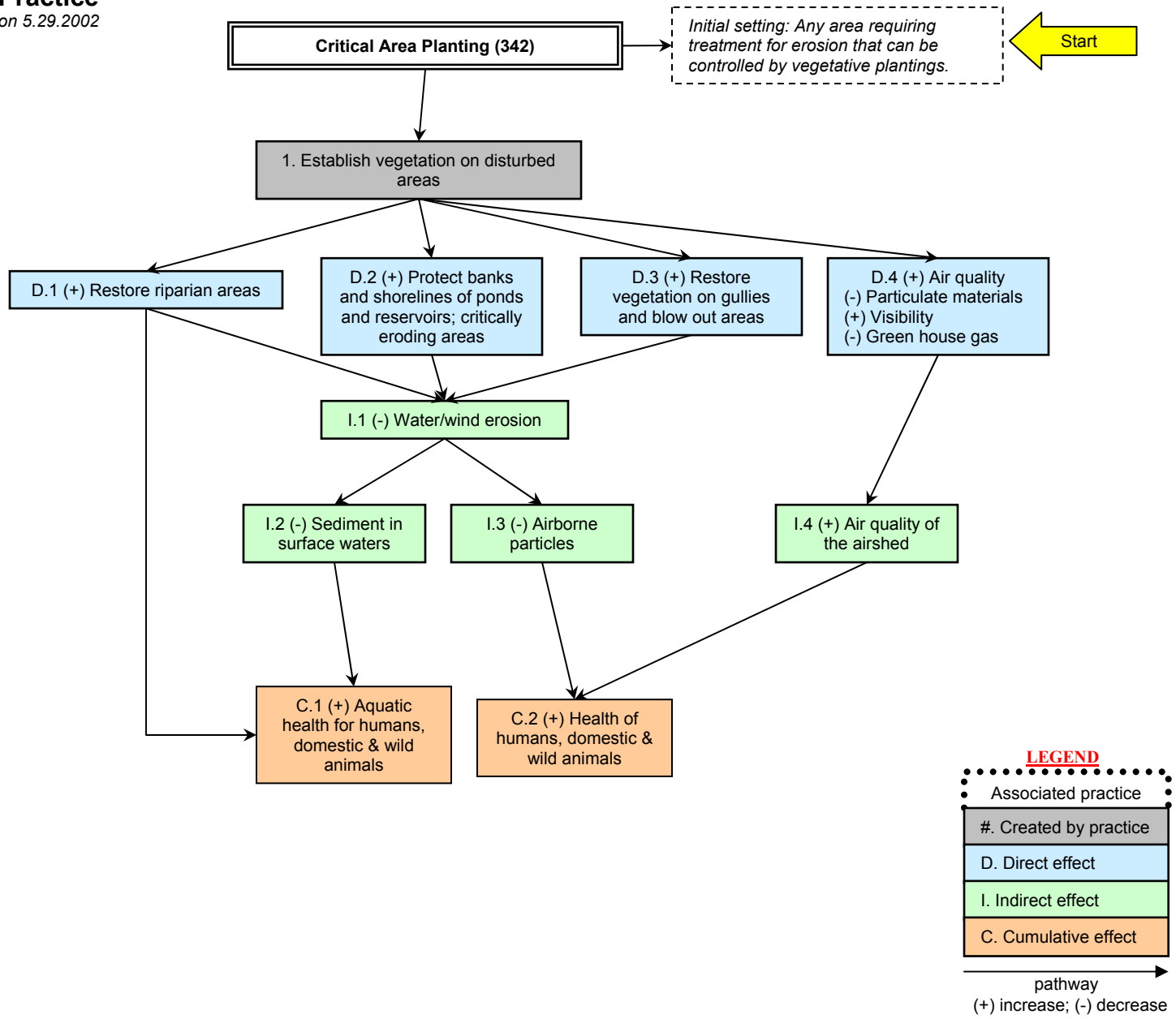
1. Function or use of the site following establishment.
2. Species of plants to establish
3. Methods and rates of planting
4. Fertilizer, lime, and soil amendments necessary for establishment and growth of the plants.
5. Mulching requirements
6. Planting site preparation
7. Irrigation requirement
8. Site management following establishment of the vegetation.

Additional information including standards and specifications are available in the NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Critical Area Planting Practice

Version 5.29.2002



DIVERSION

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 362

DIVERSION
A channel constructed across the slope with a supporting ridge on the lower side.

PRACTICE INFORMATION
This practice applies to all types of diversions except floodwater diversions (400) and diversion dams (348). The general purpose of this type of diversion is to divert excess water from one area for use or safe disposal in other areas.
This practice applies to sites where:

1. Runoff damages cropland, grazing land, farmsteads, feedlots, or conservation practices such as terraces or strip cropping.
2. Surface flow and/or shallow subsurface flow caused by seepage is causing damage on sloping cropland.
3. Runoff is excessive and available for use on nearby sites.
4. A diversion is required as part of a pollution abatement system.
5. A diversion is required to control erosion and runoff on urban or developing areas and construction or mining sites.

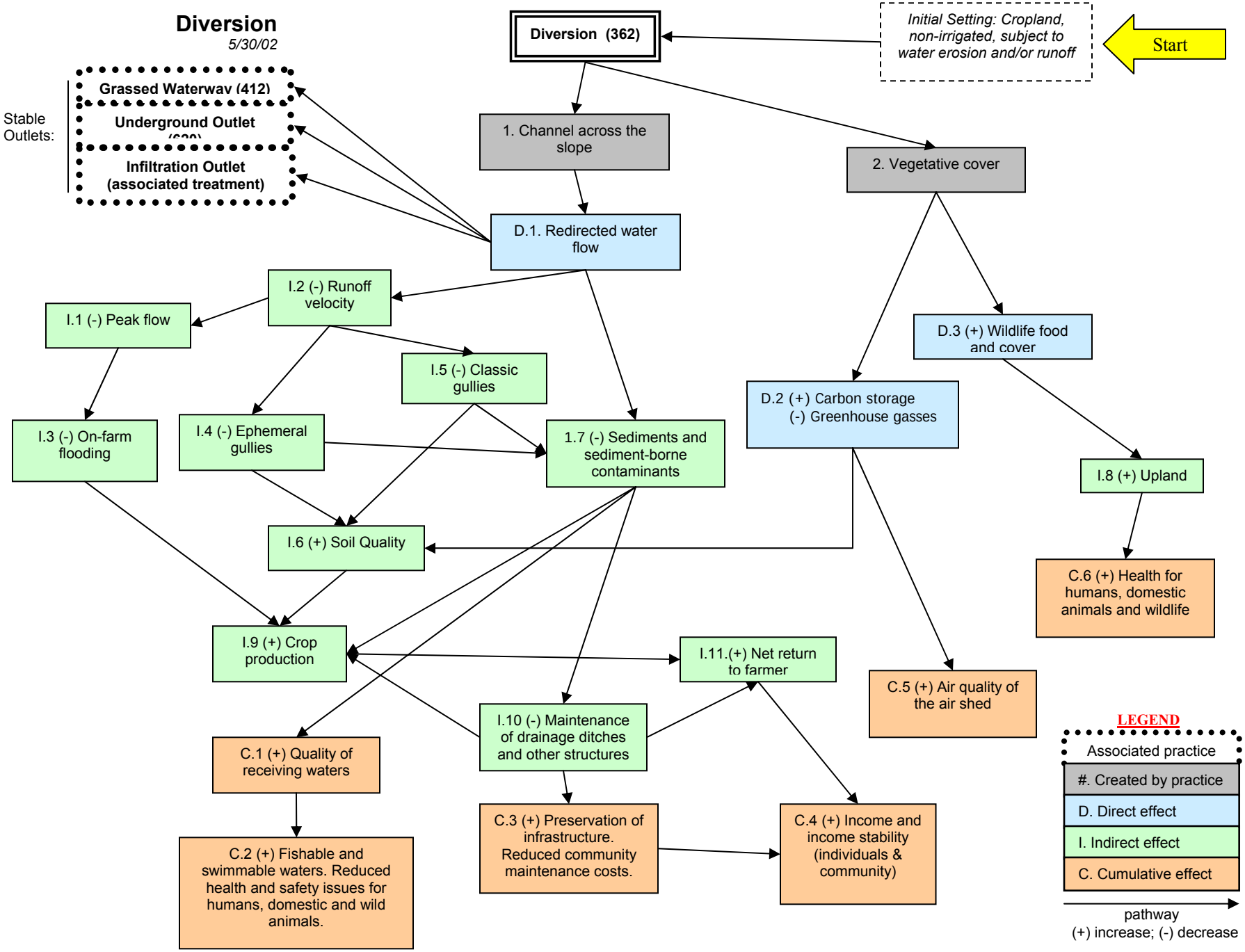
The channel may be parabolic, V-shaped, or trapezoidal. The channel grades may be uniform or variable as long as the velocity is non-erosive considering the soil and planned vegetation or lining. The location of the diversion shall be determined by outlet conditions, topography, land use, farming operations, and soil type. Diversion layout in a cultivated field should be as compatible as practical with modern farm equipment.

Diversions must have a safe and stable outlet with adequate capacity. The outlet may be a grassed waterway, paved area, vegetated area, a grade stabilization structure, a stable watercourse, underground outlet, or a combination of these structures. The outlet must be able to convey the runoff to a point where outflow will not cause damage.

If the outlet is a vegetated area, the vegetation must be established before constructing the diversion.

Additional information including design criteria and specifications are on file in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.


Diversion
5/30/02
Diversion (362)
Initial Setting: Cropland, non-irrigated, subject to water erosion and/or runoff
Start
Stable Outlets:
Grassed Waterway (412)
Underground Outlet
Infiltration Outlet (associated treatment)
1. Channel across the slope
2. Vegetative cover
D.1. Redirected water flow
I.2 (-) Runoff velocity
I.1 (-) Peak flow
I.5 (-) Classic gullies
D.3 (+) Wildlife food and cover
D.2 (+) Carbon storage (-) Greenhouse gasses
I.3 (-) On-farm flooding
I.4 (-) Ephemeral gullies
1.7 (-) Sediments and sediment-borne contaminants
I.8 (+) Upland
I.6 (+) Soil Quality
C.6 (+) Health for humans, domestic animals and wildlife
I.9 (+) Crop production
I.11.(+) Net return to farmer
C.5 (+) Air quality of the air shed
I.10 (-) Maintenance of drainage ditches and other structures
C.1 (+) Quality of receiving waters
C.3 (+) Preservation of infrastructure. Reduced community maintenance costs.
C.4 (+) Income and income stability (individuals & community)
C.2 (+) Fishable and swimmable waters. Reduced health and safety issues for humans, domestic and wild animals.
LEGEND
Associated practice
#. Created by practice
D. Direct effect
I. Indirect effect
C. Cumulative effect
pathway
(+) increase; (-) decrease

FILTER STRIP

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 393

FILTER STRIP
A filter strip is an area of vegetation established for the purpose of removing sediment, organic material, and other pollutants from runoff and waste water.

PRACTICE INFORMATION

Filter strips are generally located at the lower edge (s) of a field. This will vary somewhat with land use, topography and objectives.

A filter strip removes pollutants from runoff before the material enters a body of water. It also serves as a buffer between water and the fields above the water so that pesticides and other chemicals are not applied directly adjacent or into the water body. Filter strips also reduce sedimentation of streams, lakes and other bodies of water.

Plant species selected for planting in a filter strip requires careful planning. There may be multiple objectives that can be accomplished by proper plant selection.

In addition to the above functions, filter strips can be designed to provide one or more of the following secondary benefits:

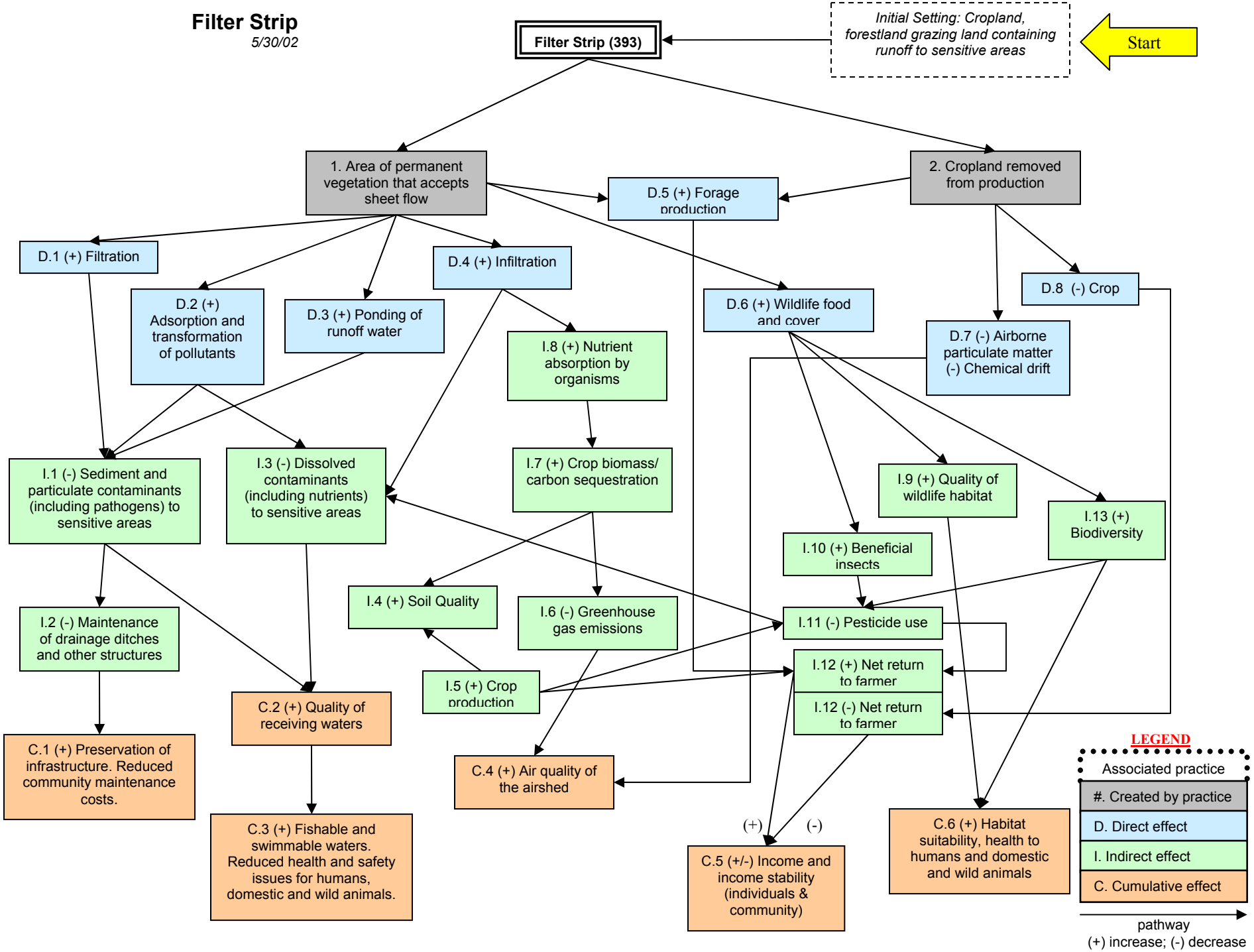
1. Improved fish and wildlife habitat.
2. Improved aesthetics
3. Improved equipment operations such as field access and turn rows or head lands.
4. Improved recreation opportunities.
5. Improved livestock forage source.

Specifications for design and installation of this practice are contained in the USDA/NRCS Field Office Technical Guide

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Filter Strip

5/30/02



GRADE STABILIZATION STRUCTURE

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 410

GRADE STABILIZATION STRUCTURE
A grade stabilization structure is used to control the grade and head cutting in natural or artificial channels.

PRACTICE INFORMATION
Grade stabilization structures are installed to stabilize the channel grade and control erosion to prevent the formation or advance of gullies and headcuts. The practice is used in areas where structures are necessary to stabilize the site. Grade stabilization structures are not designed to regulate flow or water levels in a channel area.

Special attention is given to enhancing fish and wildlife habitat where enhancement is practical. The practice is also helpful in reducing pollution from sedimentation.

Grade stabilization structures are located so that the elevation of the inlet of the spillway is set at an elevation that will control upstream headcutting.

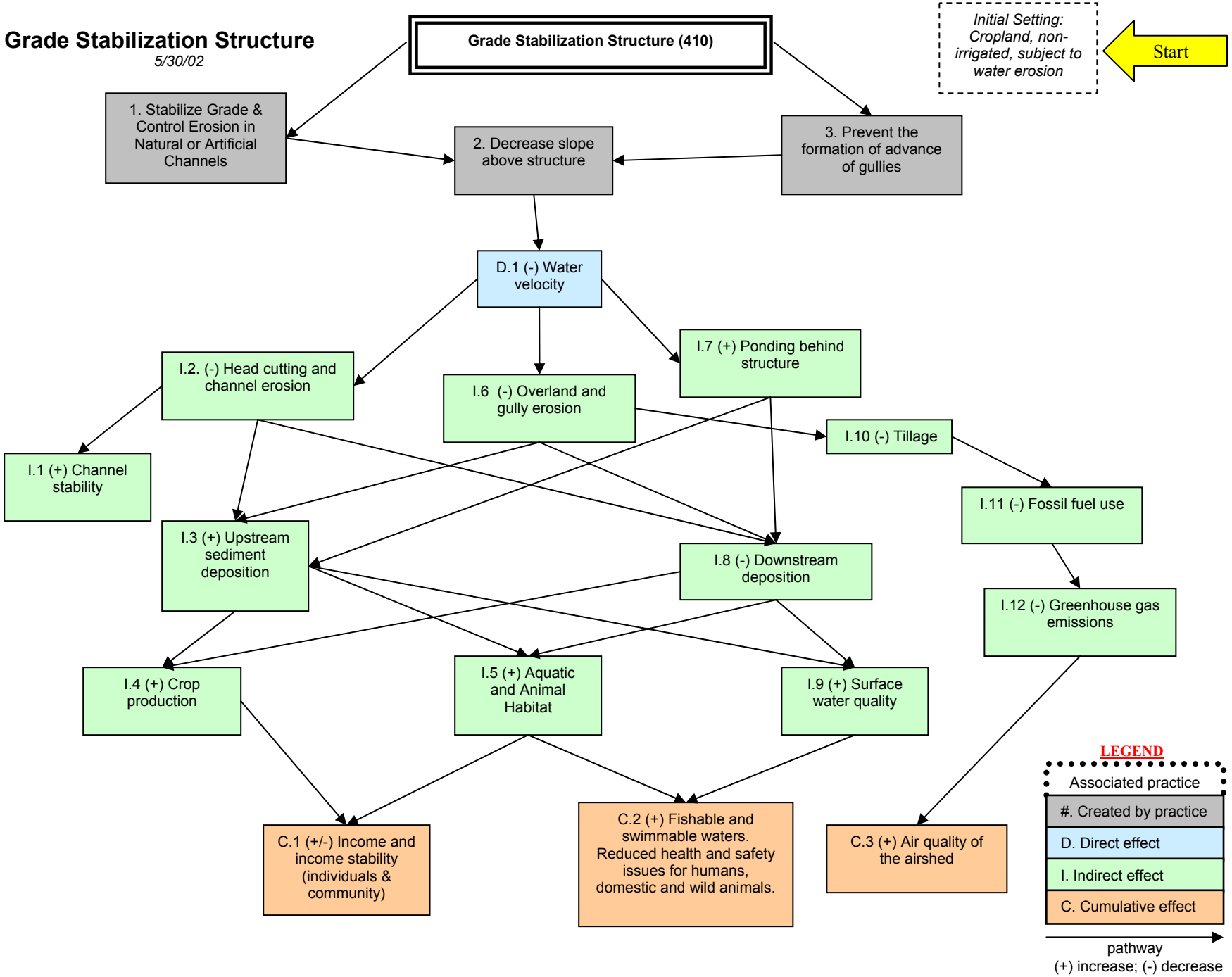
A wide range of alternative types of structures are available for this practice and an intensive site investigation is required to plan and design an appropriate grade stabilization structure for a specific site.

Additional information including design criteria and specifications are in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, and soil. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Grade Stabilization Structure

5/30/02



GRASSED WATERWAY

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 412

GRASSED WATERWAY
A grassed waterway is a natural or constructed channel established in suitable vegetation for safe water disposal

PRACTICE INFORMATION
Waterways are constructed to convey runoff from terraces, diversions, or other concentrated flow areas where erosion control is needed.

The most critical time for successful installation of a grassed waterway is immediately following construction when the channel is bare and unprotected from runoff. Waterways are generally planted to perennial grass. It is critical during the vegetative establishment period to restrict outside water from flowing through the channel. Therefore, it may be necessary delay construction of terraces and/or diversions until the waterway is well established. Another critical consideration is the outlet at the lower end. If water quality or protection of riparian vegetation (streambank) is an issue, the outlet end may need to widen significantly or another buffer or filtering type practice may be necessary. In addition, the waterway installation must assure that the runoff from the waterway does not cause gullies and/or overfalls to develop.
Grassed waterways are multipurpose and provide one or more of the following benefits:

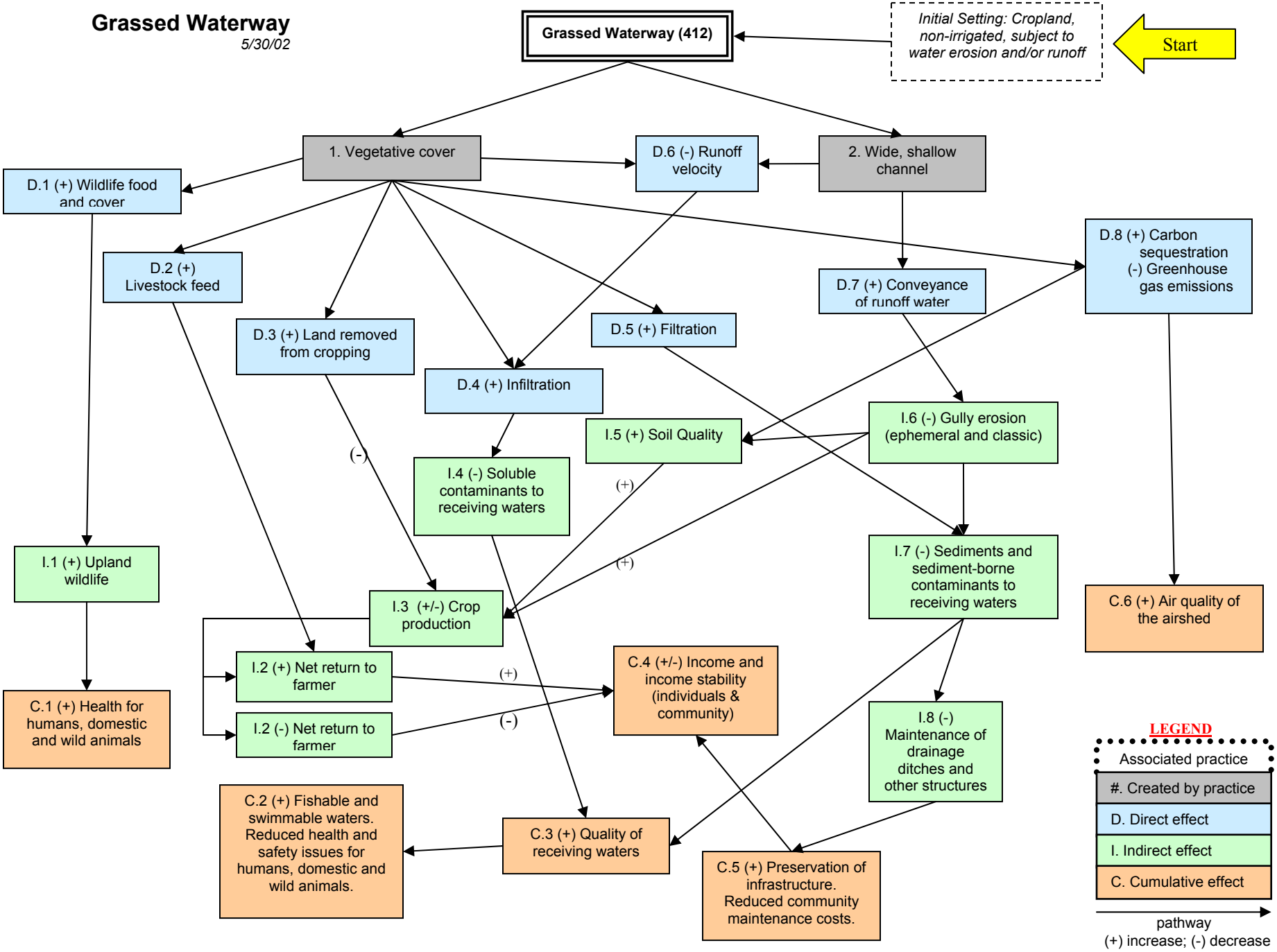
1. Safe disposal of runoff water
2. Erosion control is concentrated flow areas of a field
3. Improved water quality
4. Improved wildlife habitat
5. Reduced sediment damage
6. Improved landscape aesthetics

Additional information including standards and specifications are on file in the local NRCS Field Office Technical Guides

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Grassed Waterway

5/30/02



IRRIGATION WATER CONVEYANCE/Aluminum Tubing Pipe

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 430AA

IRRIGATION WATER CONVEYANCE/Aluminum Tubing Pipe
Irrigation Water Conveyance is a pipeline and appurtenances installed as an integral part of an irrigation system.

PRACTICE INFORMATION
Aluminum tubing underground pipelines are acceptable for irrigation water conveyance. However, the pipe must be coated with plastic tape on the exterior surfaces. The interior surface will be subject to excessive pitting if high levels of copper are present in the water. In addition, if other types of metal are joined to the aluminum pipe, the metal must be separated with rubber or plastic insulators to reduce galvanic corrosion.

These pipelines may have vents open to the atmosphere, or sealed pressure-relief valves and/or air-and-vacuum-relief valves to properly vent the system.

The purpose of the practice is to reduce erosion, conserve water, and protect water quality. Underground pipelines serve as an integral part of the irrigation water distribution system, and significantly improve the overall efficiency of the system.

This practice requires proper design and installation to function properly.

Additional information including design criteria and specifications are in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, and soil. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

IRRIGATION WATER CONVEYANCE/Asbestos-Cement Pipe

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 430BB

No Photo Available

IRRIGATION WATER CONVEYANCE /Asbestos-Cement Pipe
Irrigation Water Conveyance is a pipeline and appurtenances installed as an integral part of an irrigation system.

PRACTICE INFORMATION
Asbestos-Cement underground pipelines are acceptable for irrigation water conveyance. They are made from cement, silica, and asbestos fibers. The pipe is formed under pressure and properly cured to meet strict standards. Three types are available to meet the needs for strength and soil/water chemistry.

These pipelines may have vents open to the atmosphere, or sealed pressure-relief valves and/or air-and-vacuum-relief valves to properly vent the system.

The purpose of the practice is to reduce erosion, conserve water, and protect water quality. Underground pipelines serve as an integral part of the irrigation water distribution system, and significantly improve the overall efficiency of the system.

This practice requires proper design and installation to function properly.

Additional information including design criteria and specifications are in the local NRCS Field Office Technical Guide.

The following pages list the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, and soil. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

IRRIGATION WATER CONVEYANCE/Nonreinforced Concrete Pipe

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 430CC

IRRIGATION WATER CONVEYANCE/Nonreinforced Concrete Pipe - Irrigation Water Conveyance is a pipeline and appurtenances installed as an integral part of an irrigation system.

PRACTICE INFORMATION
Nonreinforced concrete underground pipelines are designed for low to intermediate pressures. The joints may be rubber, mortar, or cast-in-place without joints. These pipelines may have vents open to the atmosphere, or sealed pressure-relief valves and/or air-and-vacuum-relief valves.

The purpose of the practice is to reduce erosion, conserve water, and protect water quality. Underground pipelines serve as an integral part of the irrigation water distribution system, and significantly improve the overall efficiency of the system.

This practice requires proper design and installation to function properly.

Additional information including design criteria and specifications are in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, and soil. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

IRRIGATION WATER CONVEYANCE/High Pressure Plastic

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 430DD

IRRIGATION WATER CONVEYANCE/High Pressure Plastic
Irrigation Water Conveyance is a pipeline and appurtenances installed as an integral part of an irrigation system.

PRACTICE INFORMATION
High pressure underground pipelines are thermoplastic pipelines ranging from 1/2 inch to 27 inches in diameter that are closed to the atmosphere and subject to internal pressures of 80 lb/sq. inch or greater. The design for this practice includes air-release valves to properly vent the system.

The purpose of the practice is to reduce erosion, conserve water, and protect water quality. Underground pipelines serve as an integral part of the irrigation water distribution system, and significantly improve the overall efficiency of the system.

This practice requires proper design and installation to function properly.

Additional information including design criteria and specifications are in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, and soil. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

IRRIGATION WATER CONVEYANCE/Low Pressure Plastic

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 430EE

IRRIGATION WATER CONVEYANCE/Low Pressure Plastic
Irrigation Water Conveyance is a pipeline and appurtenances installed as an integral part of an irrigation system.

PRACTICE INFORMATION
Low pressure underground pipelines are thermoplastic pipelines ranging from 4 inches to 18 inches in diameter that are closed to the atmosphere and subject to internal pressures up to 50 lb/sq. inch. These pipelines may have vents open to the atmosphere, or sealed pressure-relief valves and/or air-and-vacuum-relief valves to properly vent the system.

The purpose of the practice is to reduce erosion, conserve water, and protect water quality. Underground pipelines serve as an integral part of the irrigation water distribution system, and significantly improve the overall efficiency of the system.

This practice requires proper design and installation to function properly.

Additional information including design criteria and specifications are in the local NRCS Field Office Technical Guide.

The following pages list the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, and soil. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Irrigation Water Conveyance Practice

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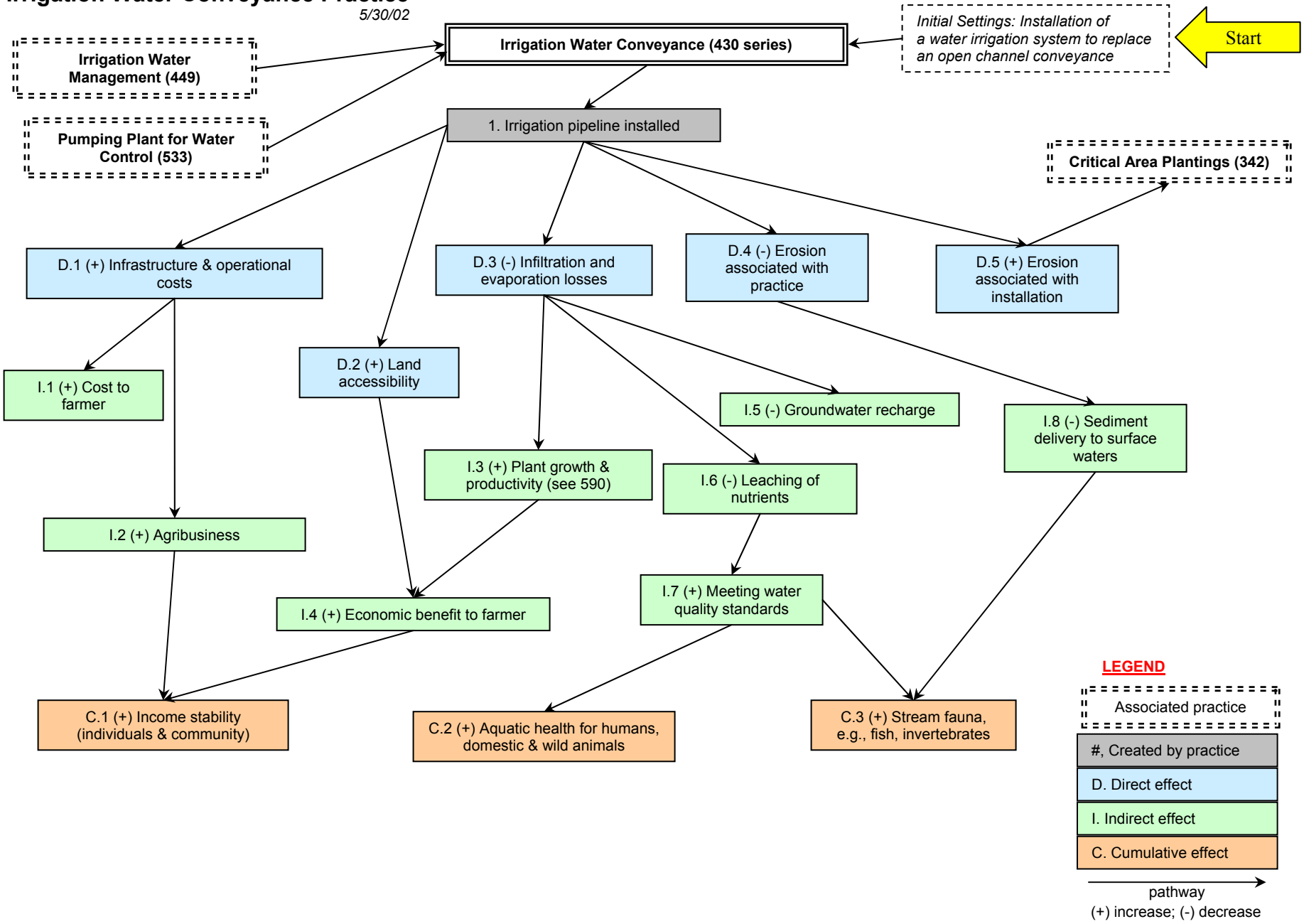


IRRIGATION WATER MANAGEMENT

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 449

IRRIGATION WATER MANAGEMENT

Determining and controlling the rate, amount, and timing of irrigation water in a planned and efficient manner.

PRACTICE INFORMATION

The purpose of this practice is to effectively use available irrigation water in managing and controlling the moisture environment of crops and other vegetation. The objectives are to promote a desired response, minimize soil erosion, minimize loss of plant nutrients, and protect both the quantity and quality of water resources.

This practice is applicable to all areas that are suitable for irrigation and have a water supply of suitable quality and quantity. In addition, a suitable irrigation system must be available and the irrigator needs to have the knowledge and capability to manage irrigation water. The following knowledge is required to properly manage irrigation water:

1. How to determine when to apply water based on the rate of use by the crops at various stages of growth.
2. How to measure or estimate the amount of water required for each irrigation.
3. The time needed for the soil to absorb the required amount of water.
4. How to detect changes in intake rate.
5. How and when to adjust stream size, application rate, and irrigation time to compensate for changes in the soil or topography that effect intake rate.
6. How to recognize erosion caused by irrigation.
7. How to evaluate the uniformity of water application.

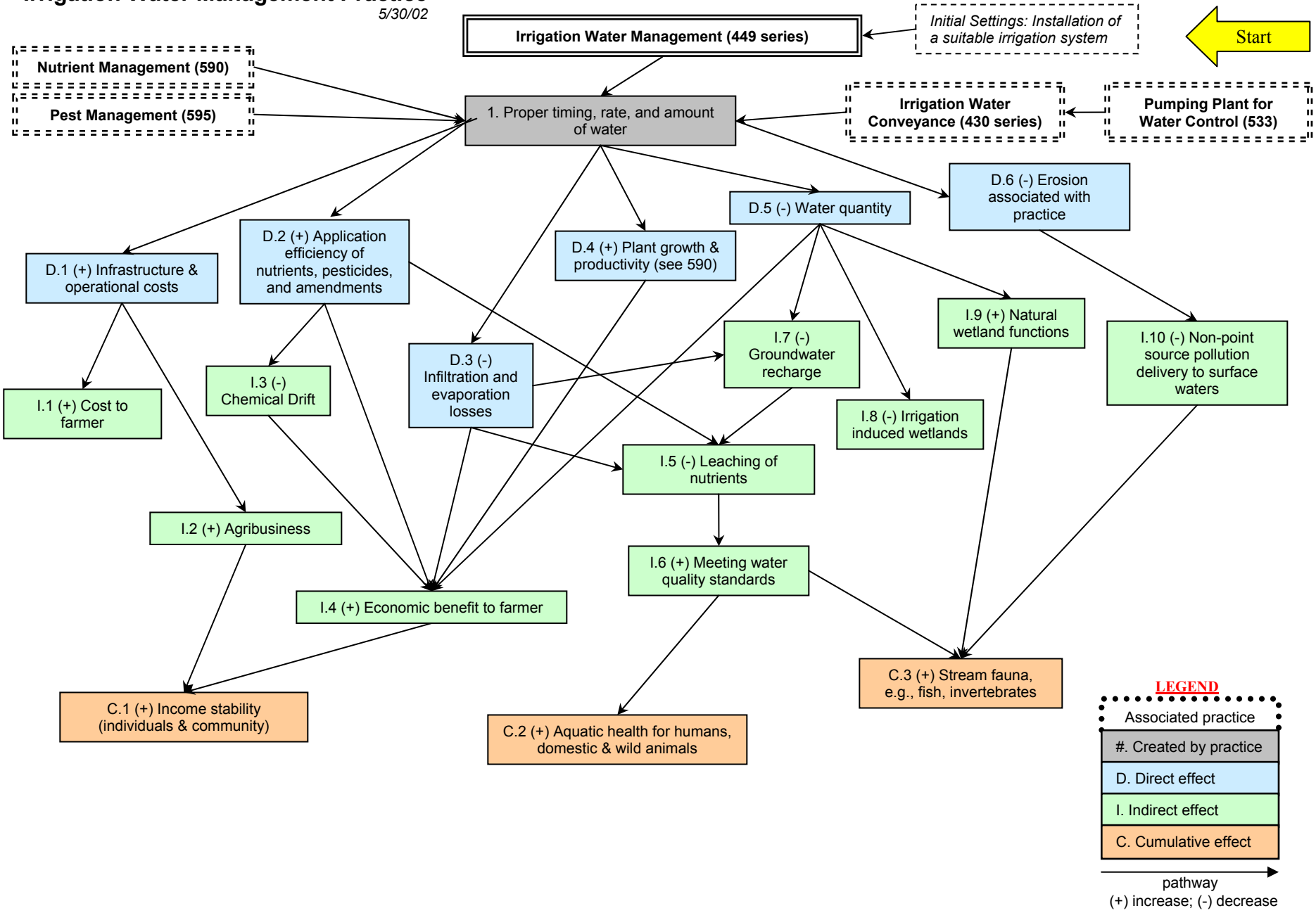
Evaluating the efficiency of applying irrigation water is expensive and time consuming. Therefore, the physical irrigation system and the technician's evaluation of the irrigators knowledge is acceptable in determining whether or not good irrigation water management is being practiced.

Additional information including standards and specifications are filed in the local NRCS Field Office Technical Guide.

The following pages contain the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Irrigation Water Management Practice

5/30/02



NUTRIENT MANAGEMENT

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 590

NUTRIENT MANAGEMENT
This practice involves managing the amount, placement, and timing of plant nutrients to obtain optimum yields and minimize the risk of surface and groundwater pollution.

PRACTICE INFORMATION
Nutrient management may be used on any area of land where plant nutrients are applied to enhance yields and maintain or improve chemical and biological condition of the soil. The source of plant nutrients may be from organic wastes, commercial fertilizer, legumes, or crop residue. The objective is to apply the proper amount of nutrients at the proper time to achieve the desired yield and minimize entry of nutrients into surface or groundwater supplies.

Planning Nutrient Management involves the following considerations:

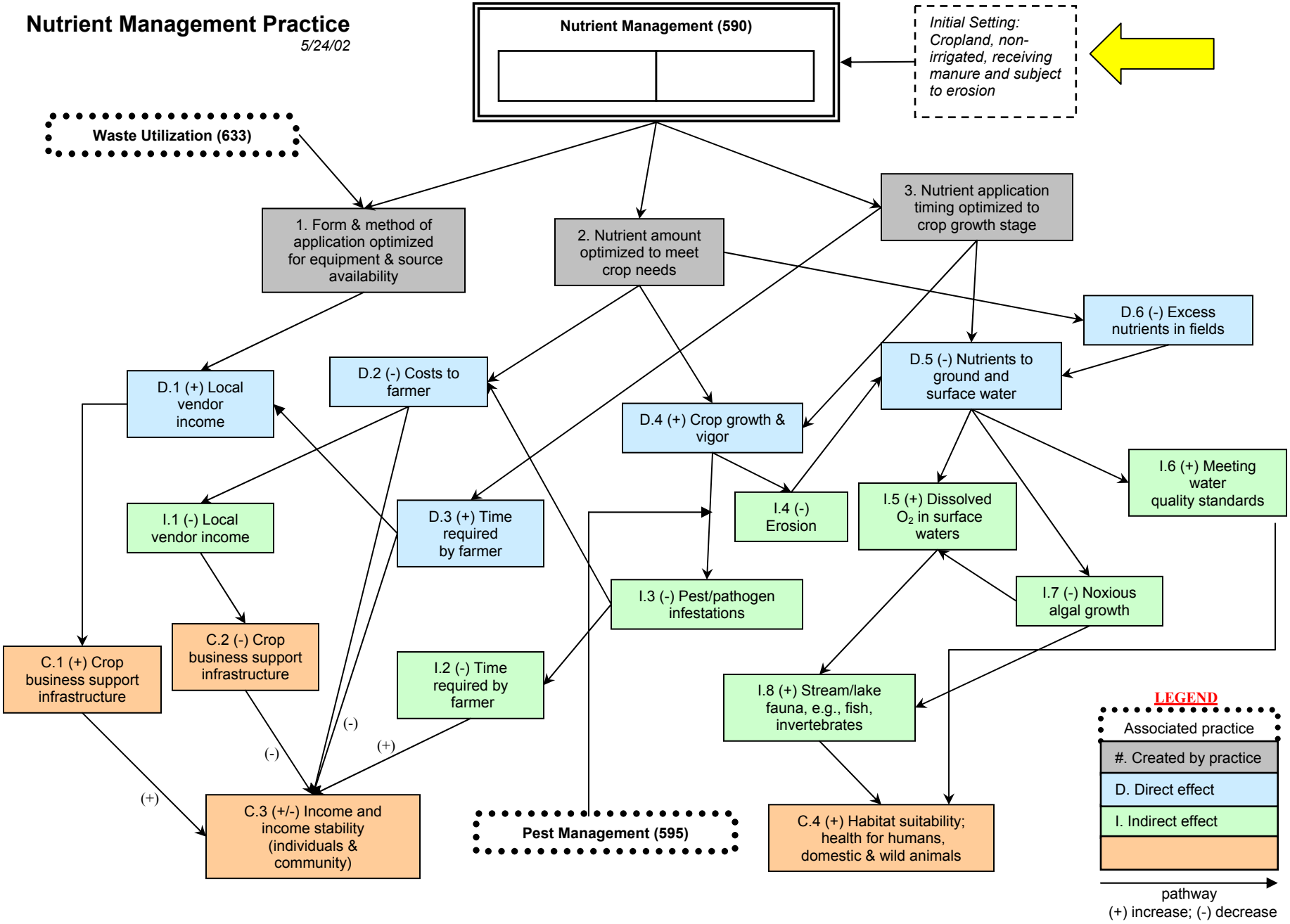
1. National, state and local water quality standards.
2. Sources and forms of plant nutrients available to the farmer.
3. Amounts and timing of nutrients based on soil testing, planned yield and growing season of target plants.
4. Evaluate use of crop rotations that enhance efficiency of nutrient utilization and improve soil tilth.
5. Consider waste storage requirements and land area requirements for proper management of plant nutrients.
6. Others.

Additional information including standards and specifications are filed in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Nutrient Management Practice

5/24/02



PEST MANAGEMENT

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 595

PEST MANAGEMENT

Utilizing environmentally sensitive prevention, avoidance, monitoring and suppression strategies, to manage weeds, insects, diseases, animals and other organisms (including invasive and non-invasive species), that directly or indirectly cause damage or annoyance.

PRACTICE INFORMATION

This practice establishes the minimum acceptable elements of a pest management program. It includes appropriate cultural, biological, and chemical controls, and combinations thereof.

The purpose of the practice is to establish a pest management program that is consistent with crop production goals and environmental concerns.

The following are major considerations regarding the pest management practice:

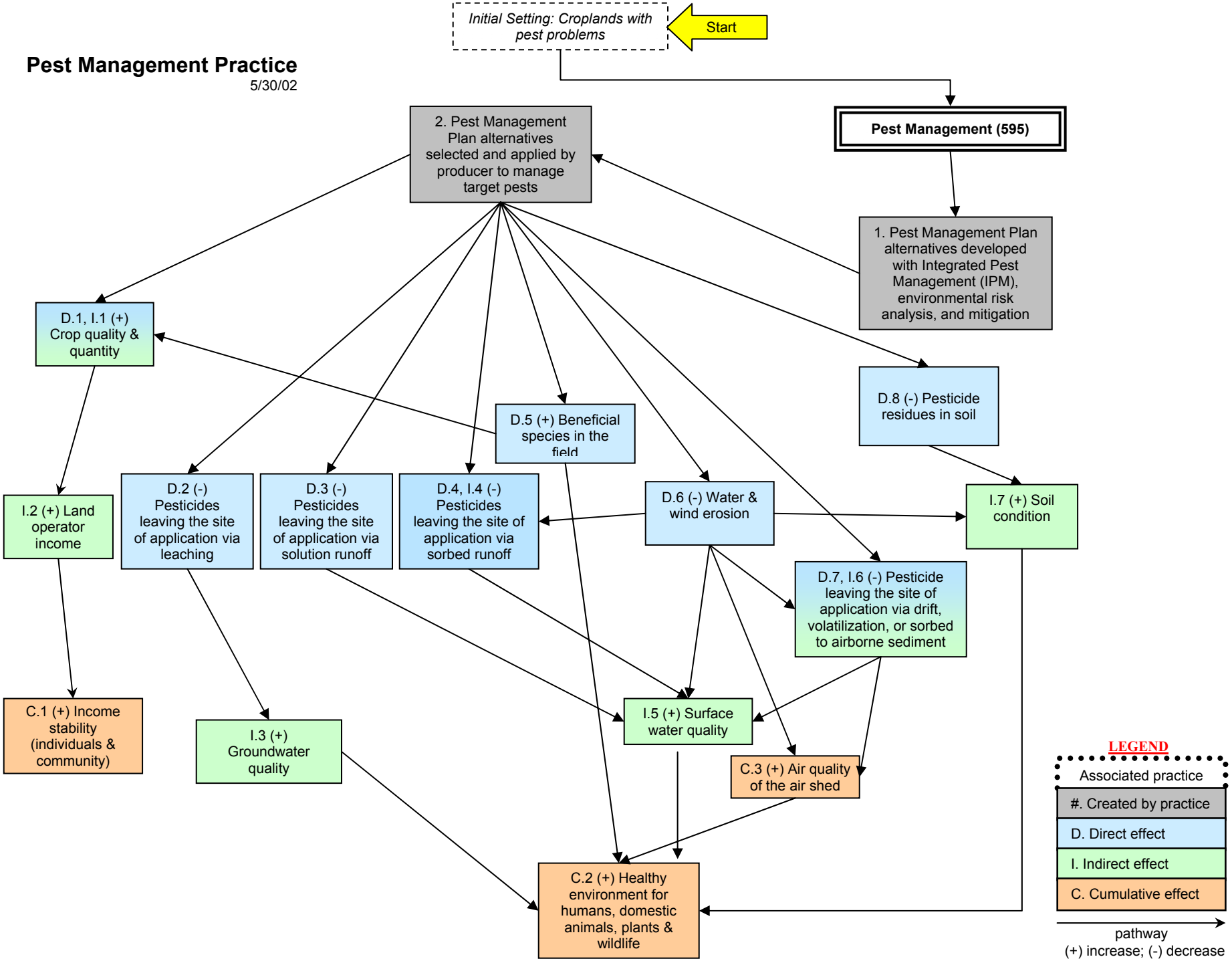
1. Use integrated pest management principles to assure the techniques a environmentally sound.
2. Use crop rotations to break up pest cycles
3. Use hand weeding or spot treatment when appropriate
4. Use biological control and beneficial insects
5. Scout fields and apply chemicals at the correct time and dose rate
6. Consider the effects of repetitive use of the same chemicals on pesticide resistance
7. Control erosion to reduce runoff and associated pollution
8. Use field borders and buffer strips to reduce potential for pollution from runoff
9. Become familiar with common pests including life cycles and learn alternative control techniques
10. Use chemicals safely
11. Always follow label instructions
12. Use extreme care in preparing tank mixes and rinsing chemicals from tanks
13. Assure farm workers are properly trained in safety precautions

Additional information including standards and specifications are included in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Pest Management Practice

5/30/02



RESIDUE MANAGEMENT, MULCH-TILL

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 329B

RESIDUE MANAGEMENT, MULCH TILL

This practice is managing crop residue on a year round basis to provide an acceptable erosion rate, conserve moisture and maintain or improve soil tilth.

PRACTICE INFORMATION

This practice generally applies to cropland but may also be used on other areas where field crops are grown such as wildlife or recreation lands.

Mulch tillage is a term used when referring to non-inversion tillage such as chiseling and disk harrowing to partially incorporate organic material left on the soil surface. Mulch tillage includes at least the following:

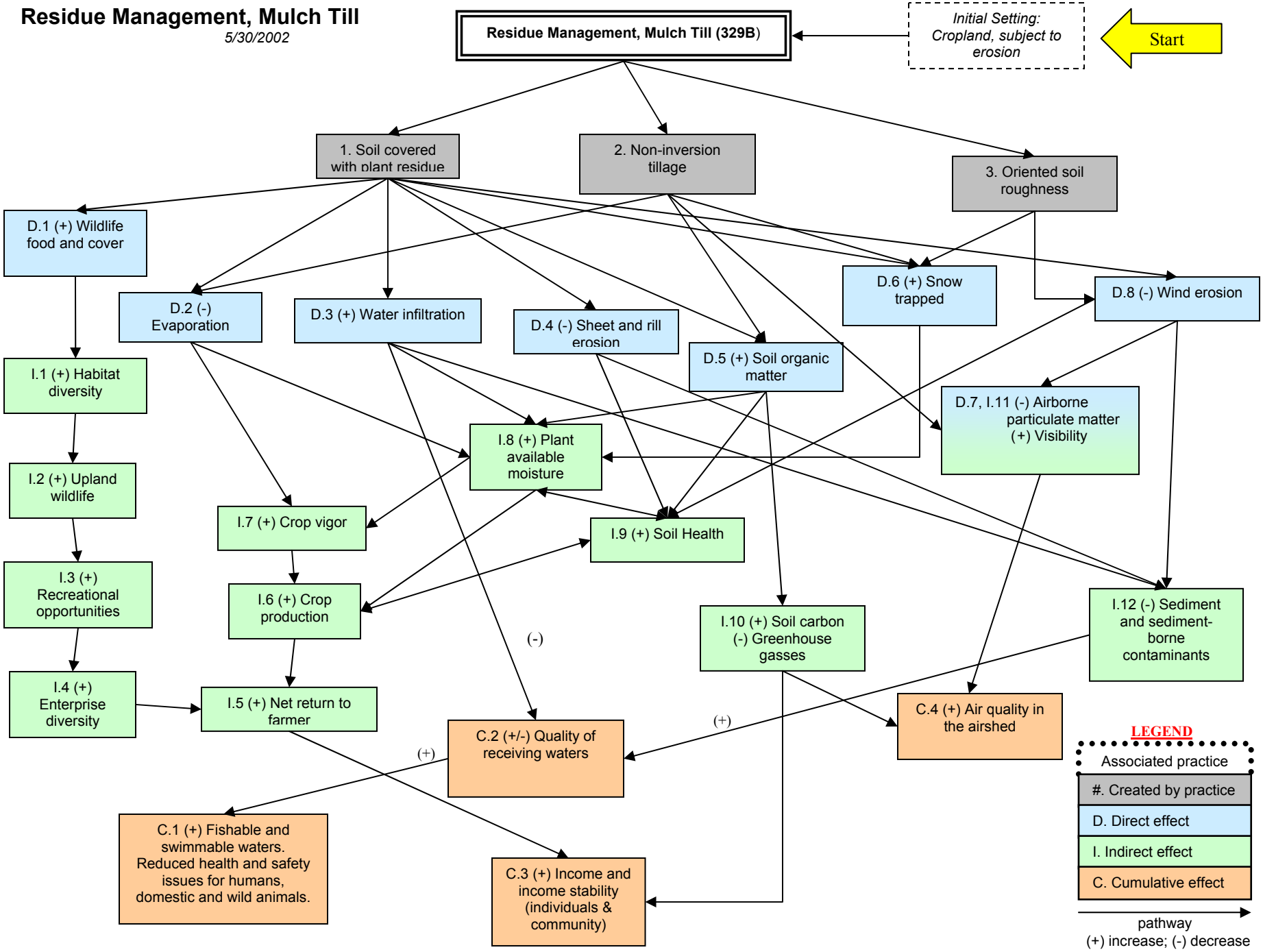
1. Uniformly spreading the residue on the soil surface to accommodate planting the following crop.
2. Use non-inversion tillage tools that only partially incorporate surface organic material.
3. Plan the number, sequence, and timing of tillage operations to achieve the prescribed amount of surface residue needed to accomplish the objectives of the practice.
4. Use planting equipment designed to operate in high residue situations.
5. Minimize removal of organic residue by burning, baling or grazing.
6. Additional criteria are provided in the practice standard and specifications contained in the NRCS Field Office Technical Guide.

The benefits of this practice are significant. Soil slowly but steadily improves when erosion is reduced and organic matter increases. Soil tilth improves and productivity increases as the constant supply of organic material left on the soil surface is decomposed by a healthy population of earth worms and other organisms.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Residue Management, Mulch Till

5/30/2002



RESIDUE MANAGEMENT, NO-TILL AND STRIP TILL

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 329A

RESIDUE MANAGEMENT, NO-TILL AND STRIP-TILL

This practice is managing the amount, orientation and distribution of crop and other plant residue on the soil surface year-round. Crops are planted and grown in narrow slots or tilled strips established in the untilled seedbed of the previous crop.

PRACTICE INFORMATION

The objective of this practice is to maintain most of the crop residue on the soil surface throughout the year. The practice may be referred to as no-till, zero-till, slot plant, row-till, strip-till or just the generic term conservation tillage. The common characteristic of this practice is that the only tillage performed is a very narrow strip prepared by coulters, sweeps, or similar devices attached to the front of the planter.

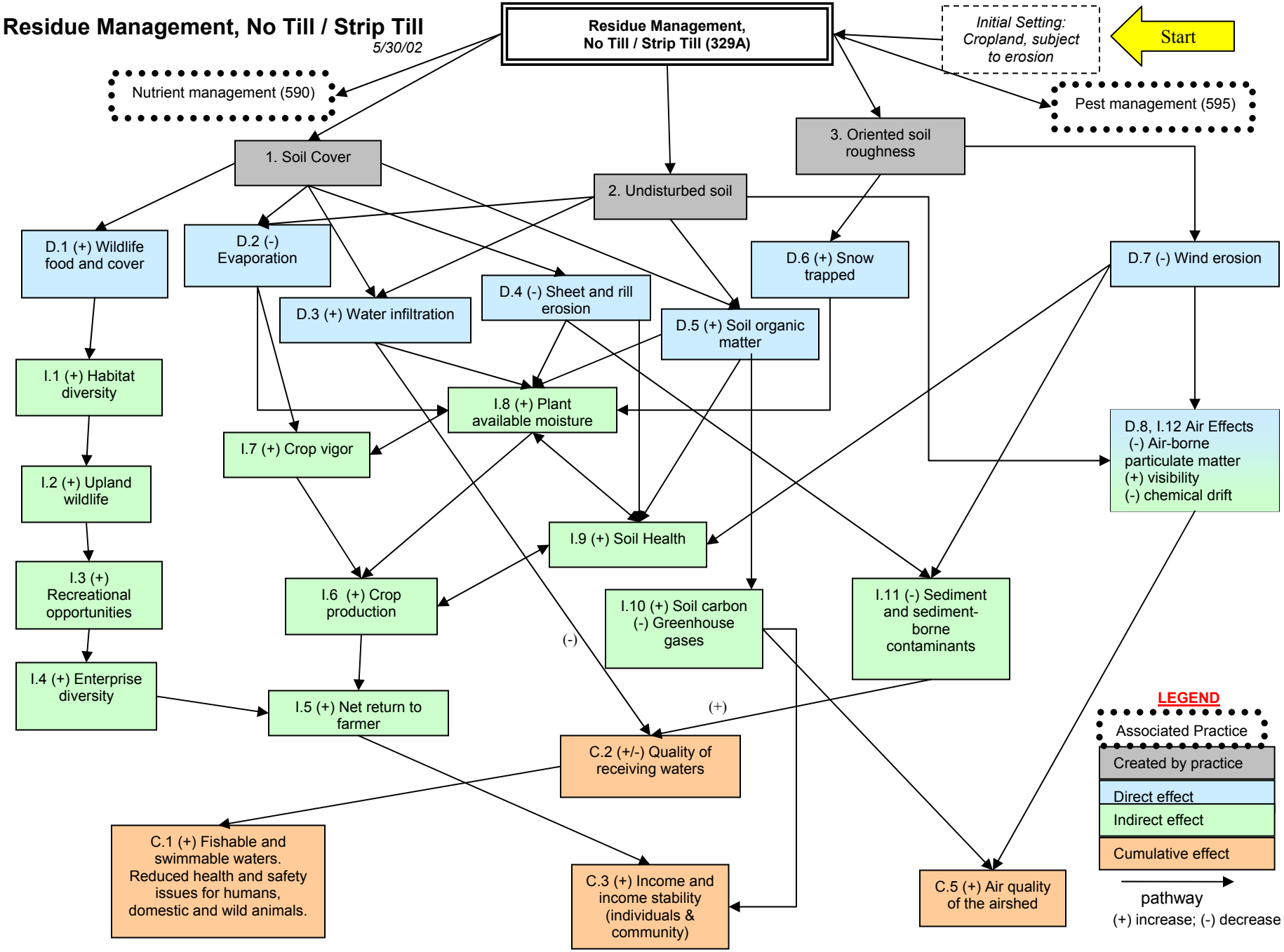
Weeds and other pests are generally managed by using agriculture chemicals. The chemicals used are approximately the same as those used with a tillage based system, but a "no-till" residue management system requires a higher level of technology and management than a more conventional tillage system. The fields must be scouted on a regular basis and the farm operator must be very familiar with the pests and understand the concept of threshold populations and other Integrated Pest Management technologies.

The benefits of this practice are significant. Erosion is usually reduced to an acceptable level due to the protective residue left o the surface. Soil organic matter increases and soil organisms such as earth worms increase progressively. The soil tilth improves, and productivity increases as the constant supply of organic material left on the surface is decomposed by a healthy population of soil organisms.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Residue Management, No Till / Strip Till

5/30/02



RESIDUE MANAGEMENT, RIDGE-TILL

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 329C

RESIDUE MANAGEMENT, RIDGE TILL - This practice is managing crop residue on a year round basis and growing crops on ridges alternated with furrows protected by crop residue.

PRACTICE INFORMATION
This practice generally applies to cropland but may also be used on other areas where field crops are grown such as wildlife or recreation lands.

Growing crops on pre-formed ridges covered with crop residue requires specialized equipment for both cultivation and planting. At crop lay-by, or last cultivation, a disk cultivator reforms the ridges for the next crop. After harvest, the crop residue is left on the soil surface until the following crop is planted. The ridge planter is equipped with a tool to clear a narrow path on the ridge top to accommodate planting the seed.

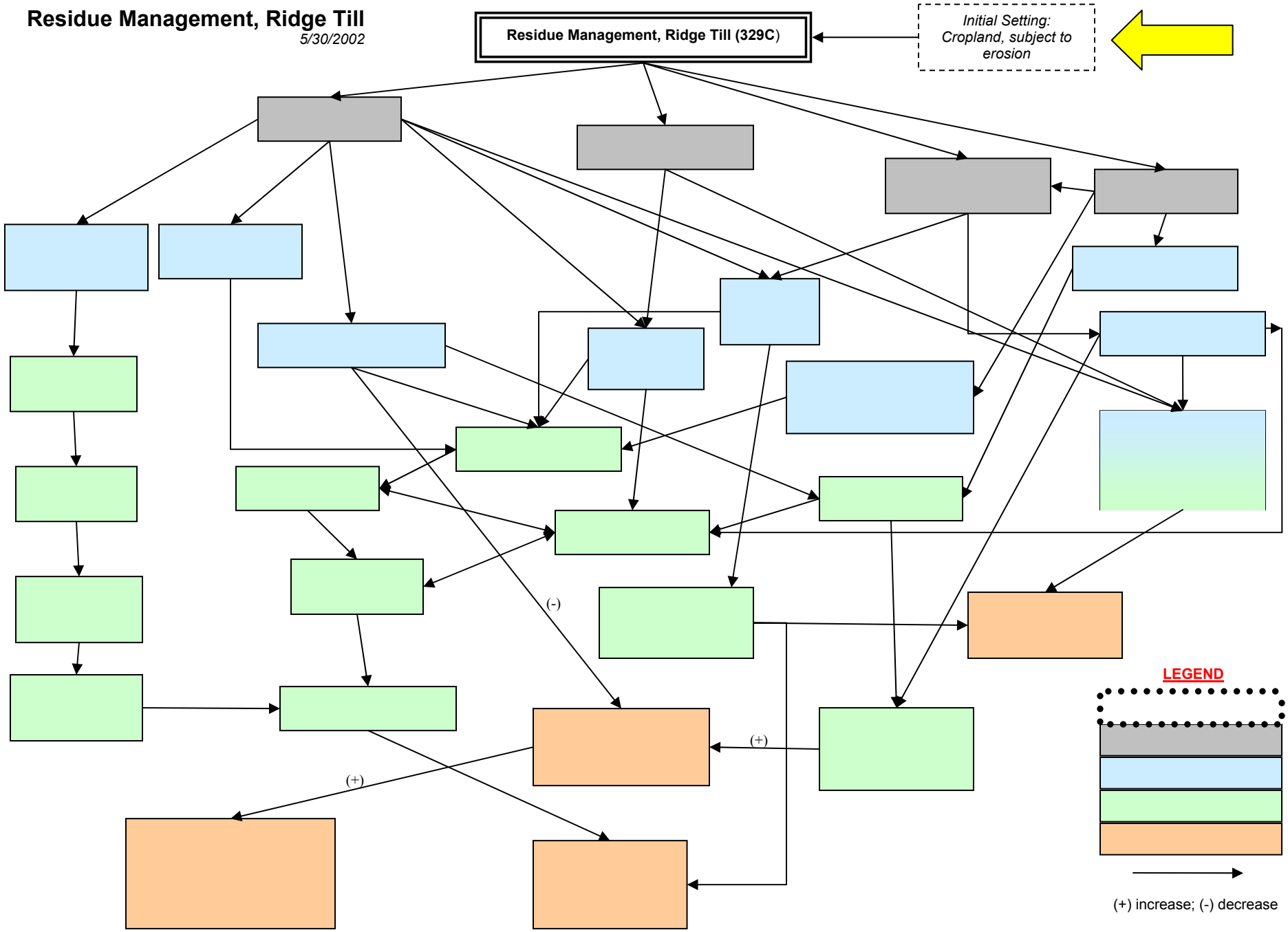
The benefits of ridge-till are significant. Soil slowly but steadily improves when erosion is reduced and organic matter increases. Soil tilth improves and productivity increases as the constant supply of organic material left on the soil surface is converted to humus by a healthy population of earth worms and other soil organisms. The surface residue plus the ridges and furrows provide excellent food and cover for wildlife.

Additional information including standards and specifications are filed in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Residue Management, Ridge Till

5/30/2002



RESIDUE MANAGEMENT, SEASONAL

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 344

RESIDUE MANAGEMENT, SEASONAL - This practice is managing to leave protective amounts of crop residue on the soils surface during a prescribed time of the year, by delaying primary tillage or seedbed preparation until immediately prior to planting time.

PRACTICE INFORMATION

This practice generally applies to cropland but may also be used on other areas where field crops are grown such as wildlife or recreation lands. The practice only applies to crops that produce sufficient amounts of residue to protect the soil from erosion.

Erosion can be significantly reduced by this practice in locations where delaying seedbed preparation allows residue to be left on the soil surface during critical periods for protection from wind and water erosion. Crops grown using this tillage system are generally planted in a relatively clean seedbed.

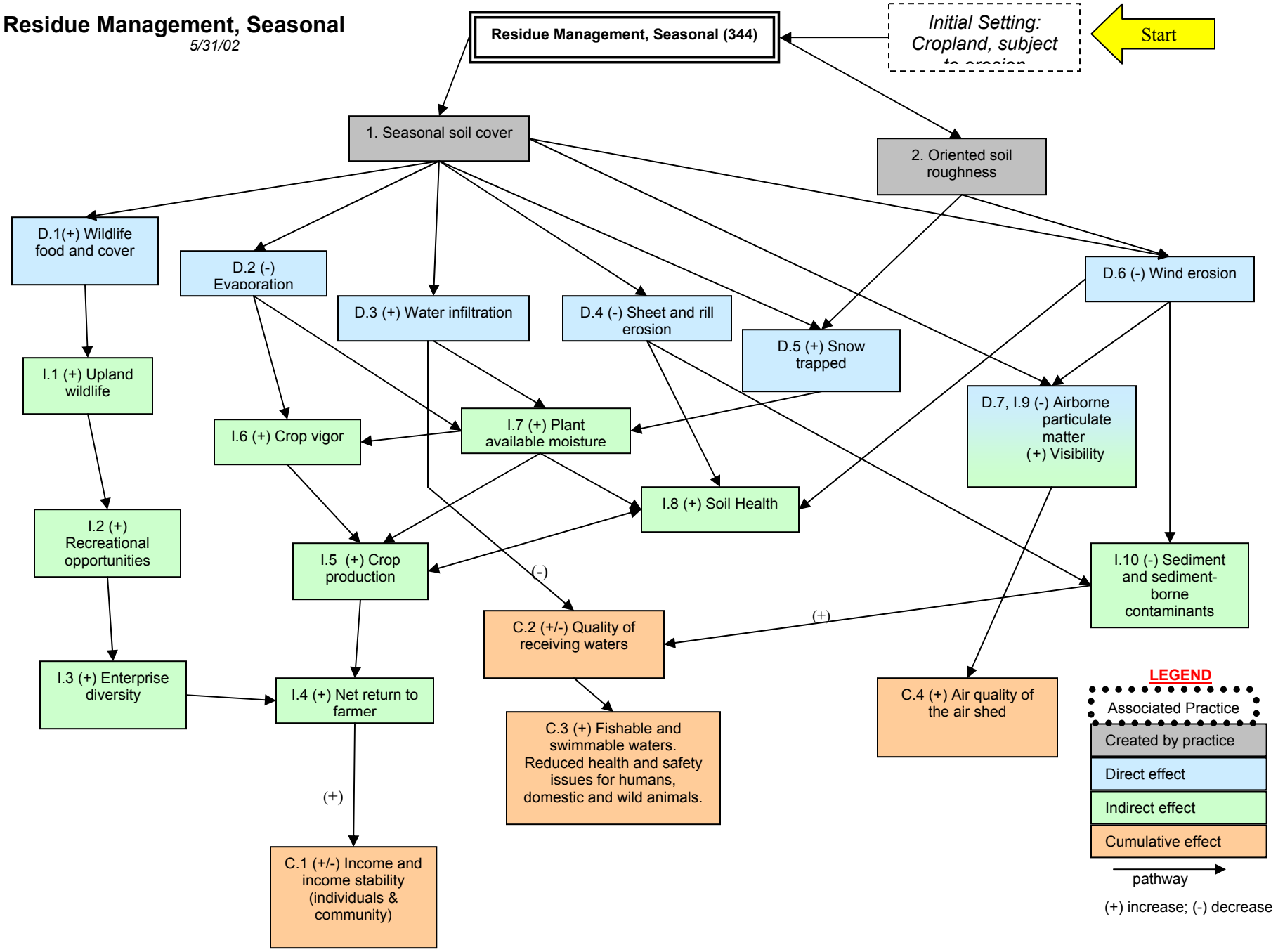
Excessive removal of plant residue by burning, baling, or grazing often produces negative impacts on the natural resources. These activities should not be performed without evaluating the impacts.

Additional information including standards and specifications for this practice are available in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Residue Management, Seasonal

5/31/02



RIPARIAN FOREST BUFFER

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 391

RIPARIAN FOREST BUFFER

A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.

PRACTICE INFORMATION

This practice applies to areas adjacent to permanent or intermittent streams, lakes, ponds, wetlands and areas associated with ground water recharge.

The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following:

1. Create shade to lower water temperatures and improve habitat for aquatic animals.
2. Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife.
3. Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.

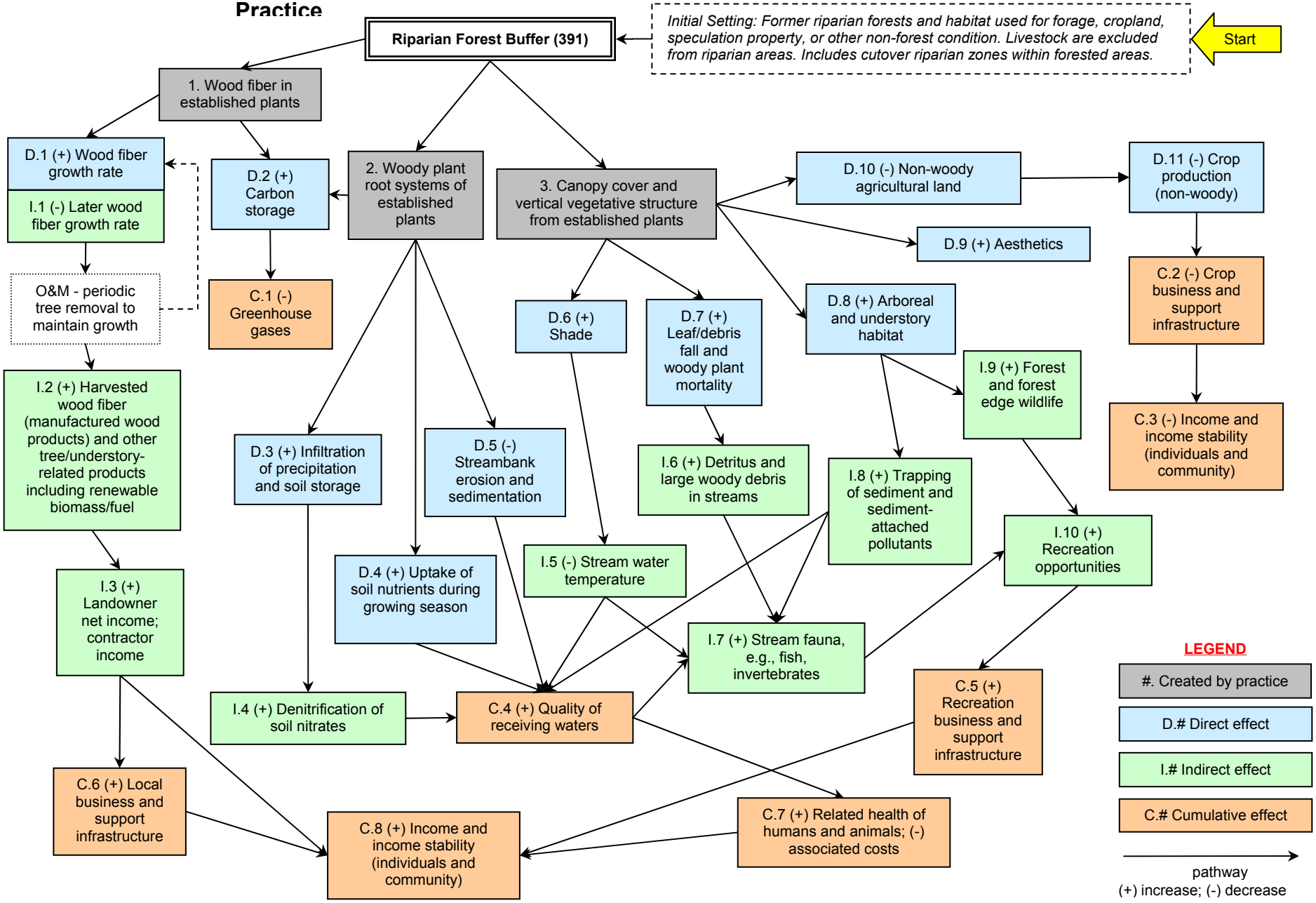
Dominant vegetation consists of existing or planted trees and shrubs suited to the site and purpose(s) of the practice. Grasses and forbs that come in naturally further enhance the wildlife habitat and filtering effect of the practice.

Headcuts and streambank erosion should be assessed and treated appropriately before establishing the riparian forest buffer.

Specifications for each installation are based on a thorough field investigation of each site.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Riparian Forest Buffer Practice



TERRACE

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 600

TERRACE
A terrace is an earth embankment, channel, or a combination ridge and channel constructed across the slope to intercept runoff water.

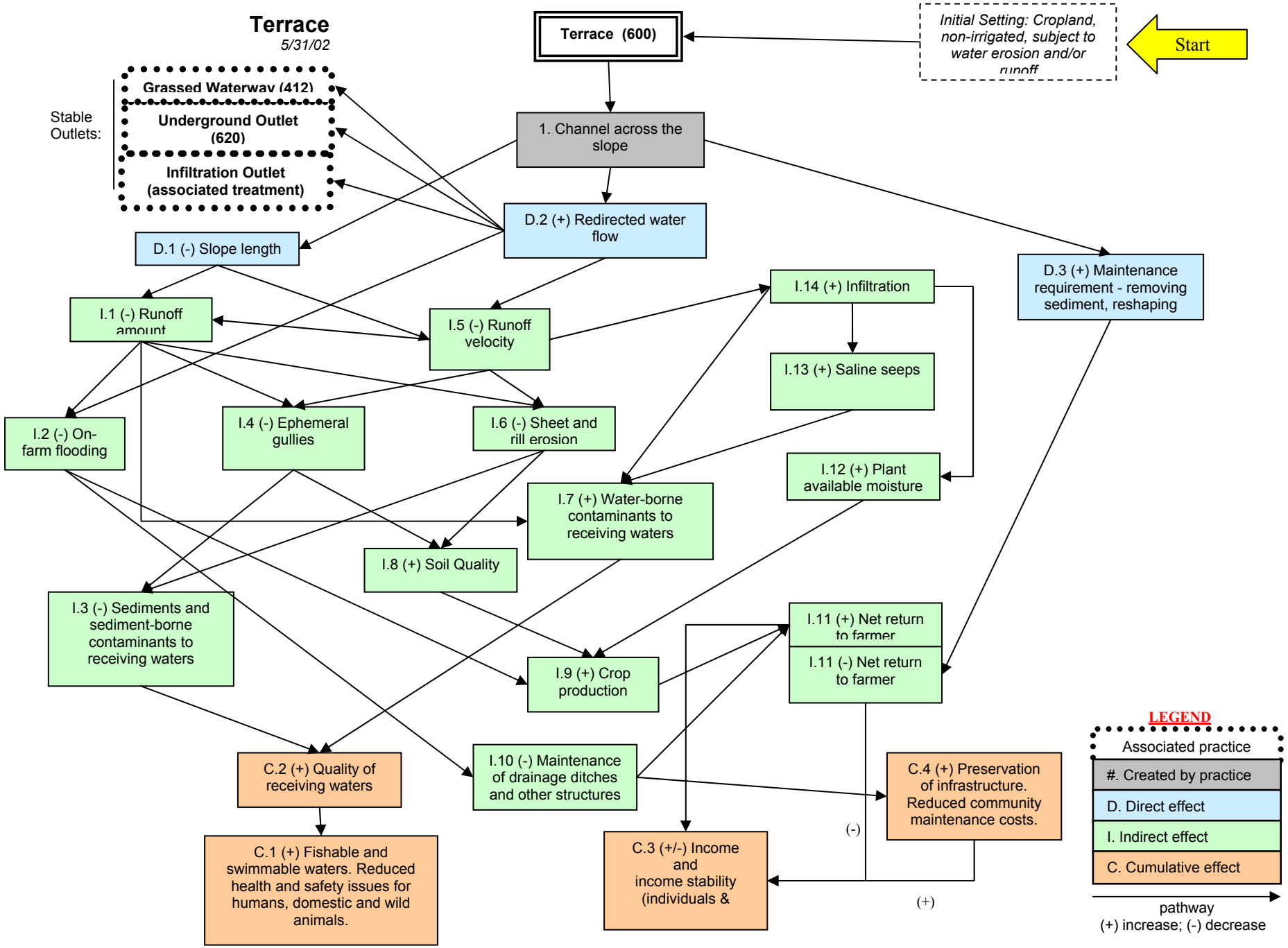
PRACTICE INFORMATION
This practice generally applies to cropland but may also be used on other areas where field crops are grown such as wildlife or recreation lands.
Terraces are installed for one or more of the following purposes: 1) Reduce slope length for erosion control, 2) Reduce sediment content in runoff water, 3) Improve water quality, 4) Intercept and conduct runoff to a safe outlet, 5) Retain runoff for moisture conservation, 6) Prevent gully development, 7) Reform the land surface for better farmability, and 8) Reduce flooding.

A variety of terrace configurations has developed as a result of research and field experience. Four common types of terraces include **broad-based** which are farmed on both sides and used on more uniform gently sloping fields; **flat channel** which are used to conserve moisture; **steep backslope** which result in a benching effect; and **narrow based** which have permanent cover planted on both sides of the ridge.

Terraces may be parallel on fairly uniform terrain or vary from parallel when the terrain is undulating. Since parallel terraces are more acceptable, designs often provide for cuts and fills to improve terrace alignment and farm-ability. Channel grades may be uniform or variable as long as the water velocity is nonerosive and meet other design criteria. The runoff from terraces may be handled by grassed waterways or underground pipe outlets depending on site conditions and economics. Soil infiltration may also be utilized for disposal of runoff when level terraces are installed and the soil is sufficiently permeable to remove the water stored in the channel before crop damage occurs.

Terraces require careful design, layout and construction. Additional information including standards and specifications are on file in the local NRCS Field office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.


Terrace
5/31/02
Terrace (600)
Initial Setting: Cropland, non-irrigated, subject to water erosion and/or runoff
Start
Stable Outlets:
Grassed Waterway (412)
Underground Outlet (620)
Infiltration Outlet (associated treatment)
1. Channel across the slope
D.2 (+) Redirected water flow
D.1 (-) Slope length
D.3 (+) Maintenance requirement - removing sediment, reshaping
I.1 (-) Runoff amount
I.5 (-) Runoff velocity
I.14 (+) Infiltration
I.13 (+) Saline seeps
I.2 (-) On-farm flooding
I.4 (-) Ephemeral gullies
I.6 (-) Sheet and rill erosion
I.12 (+) Plant available moisture
I.7 (+) Water-borne contaminants to receiving waters
I.8 (+) Soil Quality
I.3 (-) Sediments and sediment-borne contaminants to receiving waters
I.11 (+) Net return to farmer
I.11 (-) Net return to farmer
I.9 (+) Crop production
C.2 (+) Quality of receiving waters
I.10 (-) Maintenance of drainage ditches and other structures
C.4 (+) Preservation of infrastructure. Reduced community maintenance costs.
C.3 (+/-) Income and income stability (individuals &
C.1 (+) Fishable and swimmable waters. Reduced health and safety issues for humans, domestic and wild animals.
(-)
(+)
LEGEND
Associated practice
#. Created by practice
D. Direct effect
I. Indirect effect
C. Cumulative effect
pathway
(+) increase; (-) decrease

UPLAND WILDLIFE HABITAT MANAGEMENT

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 645

UPLAND WILDLIFE HABITAT MANAGEMENT - Upland Wildlife Habitat Management is creating, maintaining, or enhancing areas of food and cover for upland wildlife.

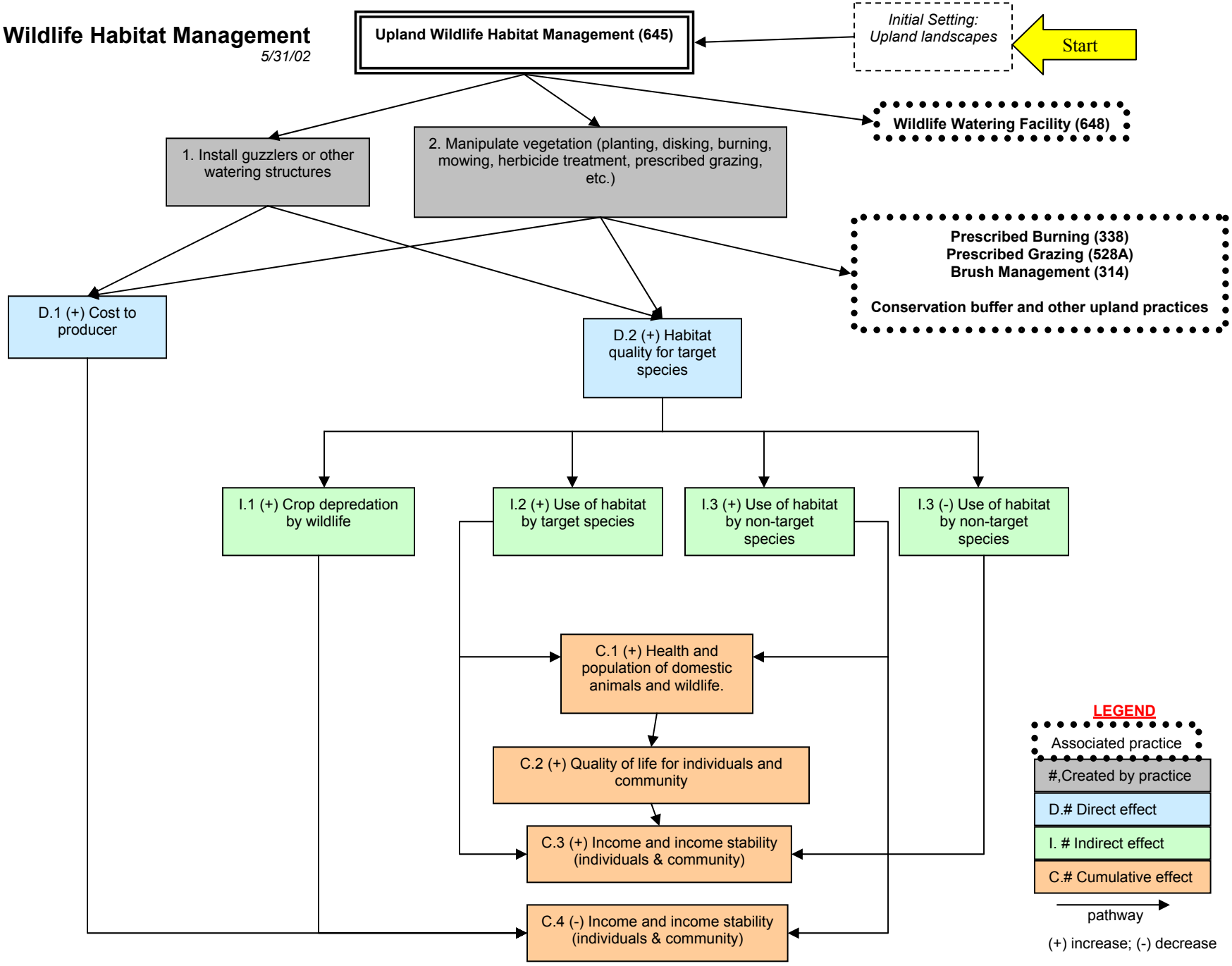
PRACTICE INFORMATION
The population dynamics of wildlife is highly dependent on food, water, and cover. The purpose of this practice is to enhance the wildlife habitat and maintain or increase populations of wildlife species. The practice applies to all areas where wildlife need improvements in food, cover, and management.

Additional information including design criteria and specifications are in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, and soil. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Upland Wildlife Habitat Management

5/31/02



WETLAND DEVELOPMENT OR RESTORATION

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 657

WETLAND DEVELOPMENT OR RESTORATION - Wetland Development or Restoration is construction or restoration of wetlands to provide the hydrological and biological benefits of a wetland site.

PRACTICE INFORMATION
This practice applies primarily to areas that were once wetland but were drained to accommodate another land use. It also applies to sites that were never wetland but are capable of storing water for wetland purposes. In most cases, dikes, or other water control structures are used to create or improve water storage on the site.

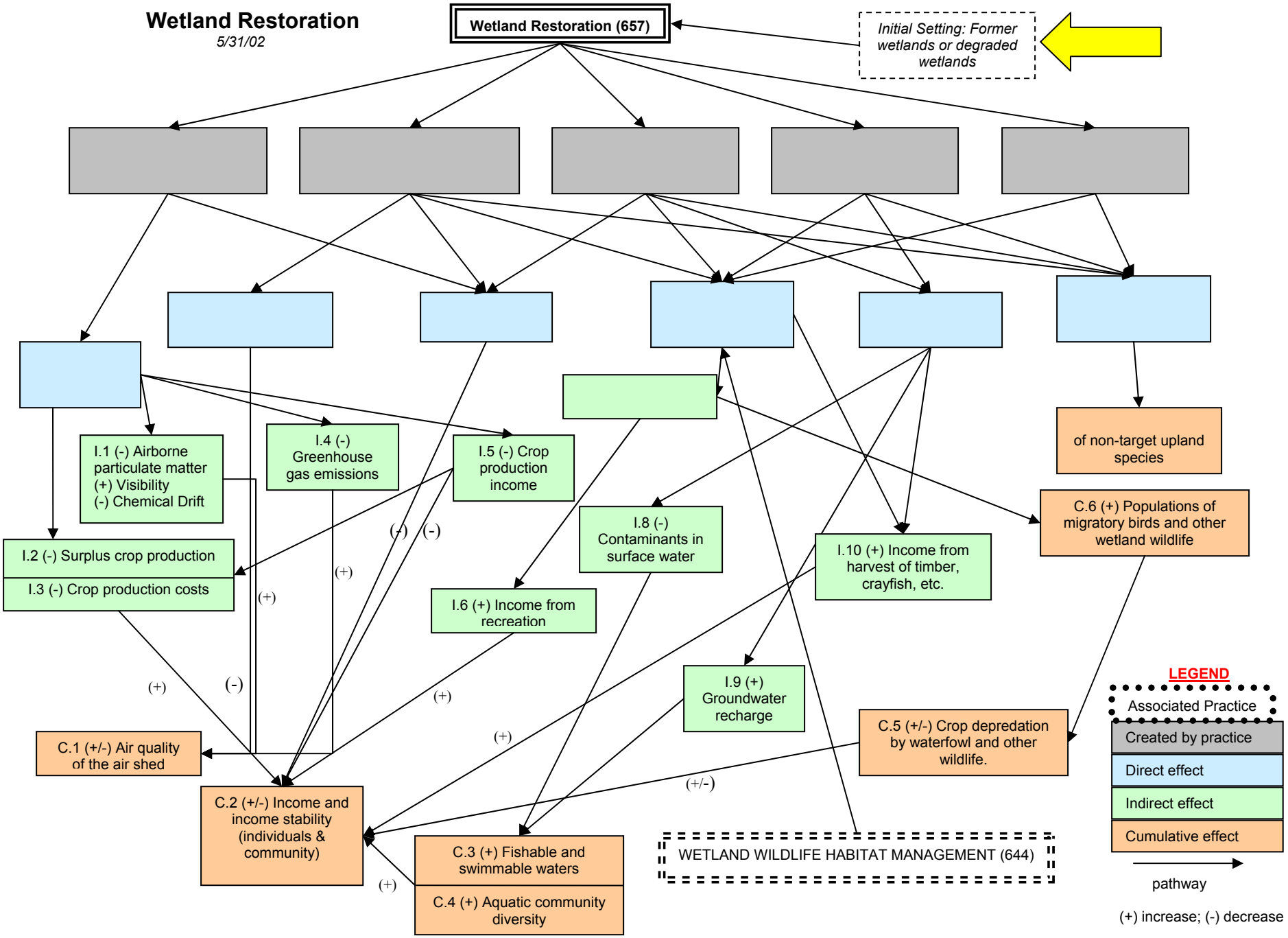
The purpose of this practice is to establish or reestablish wetlands for the benefit of wildlife, to reduce flooding, provide offsite water quality benefits, and increase groundwater recharge.

Additional information including design criteria and specifications are in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, and soil. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Wetland Restoration

5/31/02



WETLAND WILDLIFE HABITAT MANAGEMENT

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 644

WETLAND WILDLIFE HABITAT MANAGEMENT - Wetland wildlife habitat management is retaining, creating, or managing wetland habitat for wildlife.

PRACTICE INFORMATION
This practice is used to create or improve habitat for waterfowl, furbearers, or other wildlife. It applies on wetland and other areas where water can be impounded or regulated by diking, ditching, or flooding.

The practice is planned for specific species of wildlife. Specifications for the practice include items such as:

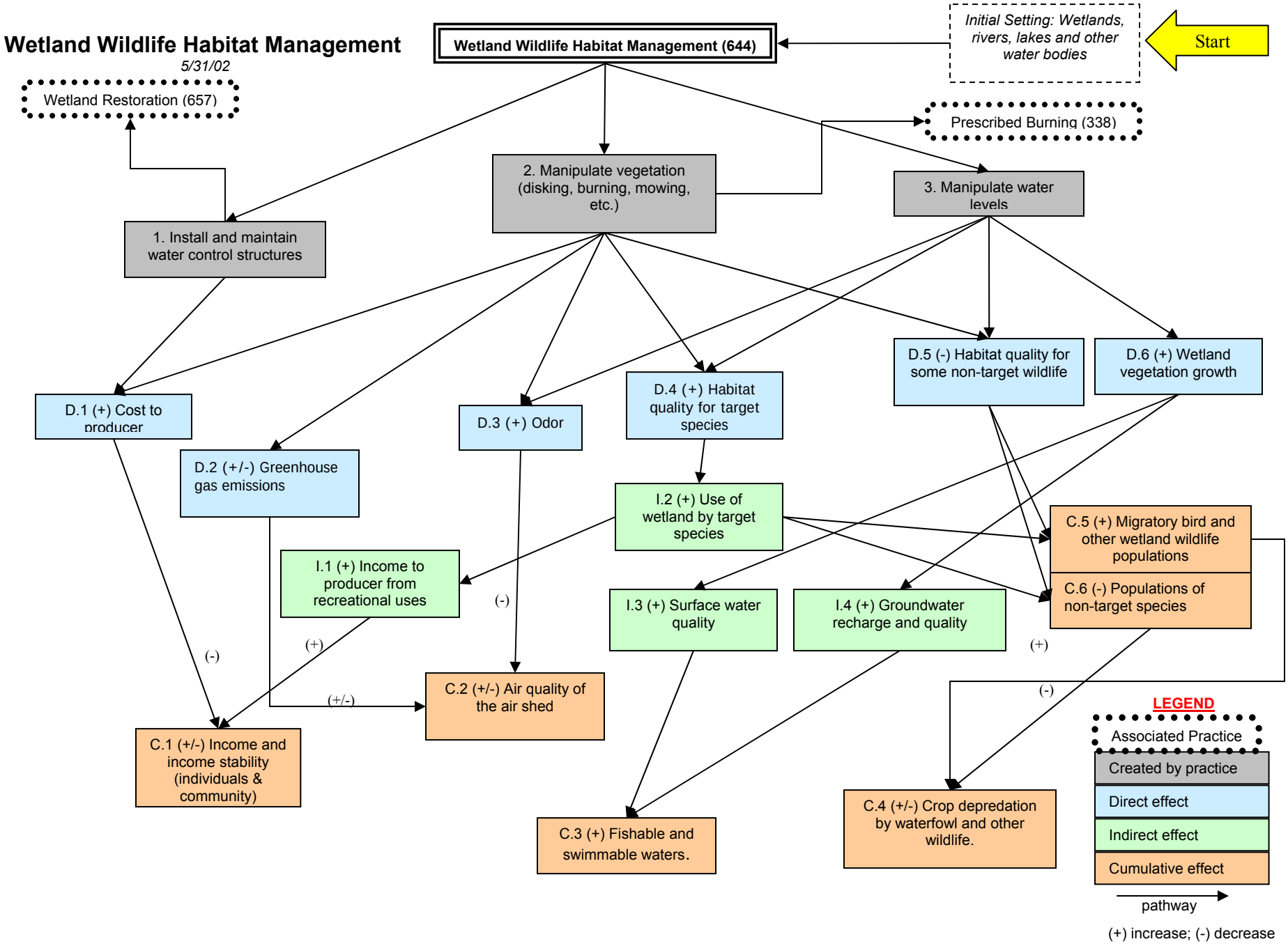
- Practice components, including structures, necessary to meet the requirements of the desired species of wildlife.
- The required seasonal water depths necessary to provide adequate habitat during different seasons of the year.
- Adapted plant species required for reproduction, food and cover by target species of wildlife.
- Management of vegetation to assure sustainability.

Additional information including design criteria and specifications are in the local NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Wetland Wildlife Habitat Management

5/31/02



WINDBREAK/SHELTERBELT ESTABLISHMENT

PRACTICE INTRODUCTION

USDA, Natural Resources Conservation Service - practice code 380

WINDBREAK/SHELTERBELT ESTABLISHMENT

Windbreaks and shelterbelts are single or multiple rows of trees or shrubs planted for environmental purposes.

PRACTICE INFORMATION

This practice can be used in any area where woody plants are suited. The specie, location, layout, and density of the planting depends on the purpose and planned function of the practice.

In areas where natural precipitation is too low for establishment of suitable woody species, moisture conservation or supplemental irrigation should be planned.

The effectiveness of a windbreak or shelterbelt is dependent on the height of the mature plants. Therefore, this is a long-term proposition that may take 20 years to become fully functional.

This is a multipurpose practice that will serve one or more of the following functions:

1. Reduce wind erosion
2. Protect growing plants
3. Manage snow
4. Provide shelter for structures and livestock
5. Provide wildlife food and cover
6. Provide tree or shrub products
7. Provide living screens
8. Improve aesthetics
9. Improve moisture use efficiency

Additional information including standards and specifications for this practice are available in the NRCS Field Office Technical Guide.

The following page identifies the conservation effects expected to occur when this practice is applied. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Windbreak/Shelterbelt Establishment and Renovation Practices

5.28.2002