TECHNICAL GUIDANCE MANUAL
CONSERVATION RESERVE ENHANCEMENT PROGRAM
11/02/04

Introduction

The purpose of this manual is to support program implementation and maximize the effectiveness of public investments in the Conservation Reserve Enhancement Program (CREP).

As stated in the Addendum Agreement between the State of Vermont and the USDA Commodity Credit Corporation dated 12/04/03, the CREP is designed primarily to reduce pollutant loading, principally phosphorus, nitrates, and sediment, to Lake Champlain and the Connecticut River; and secondarily to enhance wildlife and aquatic habitat. The implementation of a CREP contract, CREP-associated Agricultural Practice, or CREP-associated Agricultural Component must provide a water quality improvement through a change in an agricultural activity.

The technical guidance contained in this manual is intended to support the decisions of USDA and other agency partner field staff as they initiate landowner contacts and/or on-site investigations in the course of developing a CREP contract and designing associated conservation practices. This guidance can also assist in enhancing the producer's understanding of the allowable conservation practices and design standards that will be addressed during the CREP contract process.

CREP Applicability

- ***CRP Linkage:*** The CREP is linked directly with the USDA Conservation Reserve Program (CRP). There cannot be a CREP contract without a CRP agreement on the same land. Therefore, all limitations on application of the CRP, while not specifically addressed in this manual, apply substantively to the CREP. CRP and CREP contract boundaries must coincide. There being no restrictions on the number of contracts per tract of land, additional surface water buffer can be created on non-CREP eligible land under a CRP contract alone.

- ***Wetland Buffers:*** Because wetlands, as a general rule, are considered to provide water quality protection or renovation, the CREP cannot be applied to buffer isolated wetlands. An exception can be made for wetlands near or bordering surface waters where the wetland exists fully within the limits of the contract area that would normally be applied to buffer the surface water (see **Recommended Buffer Widths** below). Acreage upon which the CREP payment is calculated must exclude the wetland area unless the wetland is currently being pastured or cropped.

- ***Ditches, Channelized, or Intermittent Streams:*** Provided that water quality degradation is evident, CREP application to channelized or intermittent watercourses is limited only by the ineligibility of "ephemeral" streams as defined under the CRP; i.e., channels that

carry water only in immediate response to snow melt and/or rainfall events. Buffer widths should be determined as provided below.

- ***Areas of Concentrated Flow:*** Gullies, flood plain scour, flood chutes, or channel avulsions are all indicators of concentrated flow. While concentrated flow indicators do not preclude the applicability of CRP/CREP, additional erosion control practices may be necessary. Lands under CRP/CREP contract can be separated from the surface water body (for instance, following a flood chute) but must include the grassed waterway practice (CP8A). Wherever areas of concentrated flow do exist within a CRP/CREP contract, buffer widths may be increased as appropriate to adequately treat the water quality impairment.

- ***Natural Levees, or Diversions of Sheet Flow to the Channel:*** Even though the existing topography or land form may preclude surface water from entering the stream or river along the entire length of the riparian area, the CREP may still be applied. In such areas the appropriate buffer width may tend toward the minimum acceptable, unless there is an opportunity to capture an overland flow path aligned longitudinally with the stream or river. The Zone 3 filter strip may be eliminated in a Riparian Forested Buffer application for those areas where water does not flow overland via sheetflow to the channel.

- ***Land without Recent Agricultural Use:*** Land that is being brought back into agricultural production should not be disqualified even if it is not currently being pastured or does not meet prior use criteria for crop land. While CRP eligibility is only dependent upon a minimum of 12 months ownership of the land parcel and the existence of a resource issue, CREP eligibility is dependent upon a determination by NRCS that an agriculturally induced or linked resource concern is evident upon the involved land.

- ***Channel Stability:*** Two approaches to developing CREP contracts are presented below; the first for stable channels, and the second for unstable channels. The key consideration regarding channel stability is whether the total contract acreage will likely be substantively retained over the life of the contract. This determination will be dependent upon parameters such as rate of lateral migration or vertical profile adjustment, channel boundary resistance, and/or significant energy/channel slope imbalances. Indicators of significant rates of channel migration or vertical adjustment may be provided by the VT DEC Stream Geomorphic Assessment Database, comparison of channel location shown on succeeding aerial photo flights, in-field observation of headcuts, active bank erosion, substantial unvegetated depositional features, recently abandoned and/or incipient or developing flood plains, etc. Determination of the condition of channel stability will be made by NRCS field staff with assistance provided by DEC River Management Program where necessary.

Recommended Buffer Widths - Stable Channel

The guidelines have been developed based on information from scientific literature, other buffer standards and guidelines, and professional judgment. The recommended widths are to be used to address water quality impairments associated with overland flow, principally excessive inputs of sediment and nutrients. CREP buffer width dimensions for stable channels should meet the criteria contained in Table 1 and 2 below; in consideration of the applicable modifying factors.

The guidance covers both grassed (CP-21 Filter Strip, NRCS Practice Code 393) and forested buffer (CP-22 Riparian Forest Buffer, NRCS Practice Code 391) systems.

Recommended buffer widths are applicable in sheet flow situations only. Areas affected by concentrated flow should be addressed through implementation of grass waterways and/or establishment of increased buffer widths determined from site-specific assessments by field staff.

Buffer widths indicated are not intended to address nutrient transport via groundwater flow or subsurface drains.

The recommended buffer dimensions are considered to provide a reduction of sediment and phosphorus discharge in the range of 50%-75%.

In no instance shall a CREP contract provide for a buffer width less than the minimum AAP or BMP standards.

A grassed filter strip can be a stand alone practice (393) or as a component of the riparian forest buffer. The Riparian Forest Buffer practice (391) standard defines three zones to a buffer. Zone 1 is adjacent to the surface water, consists primarily of trees, and has cutting restrictions. Zone 2 lies between Zone 1 and 3, consists of trees and/or shrubs. Zone 3 is a grass filter strip and is required as part of the Riparian Forest Buffer on all cropland where there is sheet flow from the crop field to the stream or river. A Zone 3 is not required on cropland where there is no sheet flow directly to the stream or river. A Zone 3 can still be added to capture flow occurring laterally to the river or stream when applicable. The Filter Strip standard and criteria is used to determine the width of Zone 3 and then adjusted if part of a Riparian Forest Buffer.

- ***Filter Strip Buffer (NRCS Practice Code 393) Width Recommendations***

Table 1 contains the recommendations for dimensions of the grass filter strip. The general recommendations for the width of grassed filter strips are based on the slope of the buffer area and the hydrologic soil group of the soils in the buffer area. The base widths are then adjusted using a series of modifiers.

Table 1: Recommended Filter Strip Dimensions

Slope of Buffer and/or Contributing Area (%)	Minimum Buffer Width (ft.) Hydrologic Soil Group			
	A	B	C	D
0-3	25	25	30	35
3-5	35	35	40	55
5-8	45	45	50	65
8-10	55	55	65	85

Modifying factors:

1- Increase the buffer width dimension by 20% if the contributing drainage area to the filter strip area ratio is more than 50:1. The ratio should never exceed 60:1.

2- If acceptable to the producer, the buffer width dimension may be increased up to 20% if the adjacent cropland soils contain more than 20 ppm P according to a UVM soil test or scores High or Very High on the Vermont P Index. This applies to Lake Champlain and Lake Memphremagog watersheds and to inland lake sub-watersheds in the Connecticut River watershed.

3- If acceptable to the producer, the buffer width dimension may be increased up to 20% if the buffer is adjacent to a Vermont 303(d) listed stream reach for which the impairments are specifically attributed to agricultural run-off. This includes all upstream reaches within the watershed contributing to the listed reach. See Appendix A.

4- Increase as appropriate based on field assessments for areas of concentrated flow.

Note: Ineligible land may exist between the CRP/CREP eligible land and the surface water. For the purpose of determining the width of the buffer under contract, subtract the width of any ineligible land that will, for the length of the contract, function as buffer from the recommended buffer width in Table 1.

- ***Forested Buffer (NRCS Practice Code 391) Width Recommendations***

The recommendations for forested buffers apply to areas that have permanent vegetation (pasture and continuous hay) and to cropland areas. Crop category applies to hay and crop rotation. All forest buffers should contain a woody Zone 1 and Zone 2. All forested buffers on cropland are also required to contain a grassed Zone 3 except where a field determination has been made that flow is not directly entering the stream. The CREP contract will prohibit timber harvesting from Zone 1 and 2 for the duration of the contract.

Table 2: Minimum Forested Buffer Dimensions (ft.)

	Pasture or Continuous Hay	Crop
Zone 1 & 2	35	35
Zone 3	N/A	Table 1 dimension minus (0.5 X Zone 1 & 2)

Forested buffer Zone 1 & 2 dimensions should be increased if slope within the buffer area is greater than 5% or in consideration of other pertinent site conditions such as proximity to listed impaired waters, soil type, or to take advantage of breaks in slope or topography. Dimensional increases should be based on field staff judgment.

Note: Ineligible land may exist between the CRP/CREP eligible land and the surface water. For the purpose of determining the width of the buffer under contract, subtract the width of the ineligible land from the recommended buffer width from Table 2.

- ***Recommended Buffer Widths for Streams with Temperature Concerns***

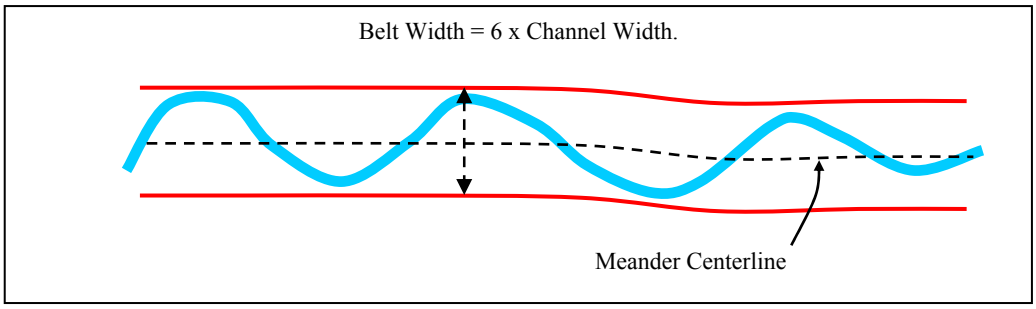
CREP buffers along streams listed as impaired for temperature must include a forested riparian buffer on cropland as well as pasture. Species selected and planting density in Zone 1 and 2 shall maximize the potential for establishment of shading and canopy over the stream channel. Buffer widths shall be developed as established above. On wider streams where full canopy is not possible at maturity, site aspect shall be taken into consideration such that plantings for shading be maximized on southerly and westerly streambanks.

Acceptable Buffer Widths - Unstable Channel

Whenever a determination by NRCS field staff is made that an unstable channel exists within the contract reach i.e. it is likely that the contract acreage may be substantively reduced over the life of the contract, water quality protection can be best accomplished by delineating the CREP buffer as to capture a corridor within which the stream channel my express its physical imperatives without conflict with the goals of the CREP contract. This approach avoids fluvial erosion compromising the width and effectiveness (sediment capture and nutrient removal) of the buffer over time. This is referred to as the **belt width**.

The belt width dimension is a function of the channel width and is delineated as an offset from the **channel meander centerline**. The meander centerline consists of a line drawn connecting the cross-over points between the meander bendways, or in a straight channel spaced longitudinally every 10 channel widths. See Figure 1. To be viable, the belt width buffer delineation approach should generally be applied to a stream reach length of at least two meander wavelengths or in the range of 24-28 channel widths.

Figure 1



In the absence of additional geomorphic information, a belt width based CREP buffer should be delineated three channel widths either side of the meander centerline. Wherever the meander pattern of a channel segment extends outside the belt width, the CREP buffer shall be increased laterally the minimum applicable dimensions for the buffer treatment (#393 or #391) shown above for stable channels.

If additional geomorphic information regarding the **reference and existing stream type** for stream reach involved is known, the belt width dimension may be modified dependent upon the sensitivity range (see Table 3) of the particular stream type as follows:

A. The CREP buffer width shall be equal to the buffer width shown above for stable channels if the stream is a bedrock or boulder substrate reference stream type (**low to moderate sensitivity**); or

B. The CREP buffer width shall be equal to 2 channel widths either side of the meander centerline if the stream is a steep to moderate gradient reference stream type (**moderate to high sensitivity**) **and** the existing stream type **does not represent a stream type departure**; or

C. The CREP buffer width shall be equal to 3 channel widths either side of the meander centerline if the stream is a steep to moderate gradient reference stream type (**moderate to high sensitivity**) **and** the existing stream type **represents a stream type departure**; or

D. The CREP buffer width shall be equal to 3 channel widths either side of the meander centerline if the stream is a gentle gradient or braided reference stream type (**high to very high sensitivity**).

Table 3

Sensitivity Class	Reference Stream Type
Low to Moderate	A1, A2, B1, B2, C1, C2, F1, F2, G1, G2
Moderate to High	A3, A4, A5, B3, B4, B5, C3, F3, G3, G4, G5
High to Very High	C4, C5, D3, D4, D5, E3, E4, E5, F4, F5

In no case shall CREP buffers extend beyond (away from the stream) the toe of the valley walls. If three channel widths on one side of the meander centerline extends beyond the toe of the valley wall, the six channel widths will be measured from the toe of the valley wall, if available. Where necessary, DEC River Management Program technical staff will provide assistance to NRCS field staff in the determination of reference stream type and sensitivity class. For the purpose of acreage calculation, all land shall be computed within the belt width corridor, not including the area inside the tops of the stream banks and any Class I or II Wetlands unless the Class I or II Wetlands are currently being pastured or cropped.

Applicability of a belt width approach-based buffer delineation should not be precluded even if only one side of the channel is enrolled. Nor should the determination of contract boundaries be altered from the guidance provided above. If a CREP contract is being considered that captures only one side of an unstable stream reach, the dimensional length of the contract, in terms of meander wavelengths, will be a necessary consideration in order to achieve the objective of no substantive reduction in the contract acreage over the life of the contract. Generally, the contract area would have to enroll at least one full meander wavelength, and preferably greater than one meander wavelength.

- ***Practice #393 - Filter Strip:*** For unstable channels, in a belt width based buffer delineation, a grass filter strip is applicable only adjacent to those areas where the meander pattern of a channel segment extends outside the six channel width corridor. In such locations, the Filter Strip width shall be delineated as for stable channels above. Otherwise, Practice #391 – Riparian Forest Buffer must be the selected practice within a belt width based buffer.

- ***Practice #391 – Riparian Forest Buffer:*** For unstable channels it may not be appropriate to apply the Riparian Forest Buffer practice to the entire land area within the belt width corridor; particularly in areas threatened by erosion in the near or foreseeable future. For the purpose of calculating the land area and plant materials volumes required for treatment, a reasonable reduction in the range of 15%-40% may be based on best judgment.

Eligible CREP Associated Agricultural Practices

- ***Grass Waterways (CP8A):*** For cropland only in areas of concentrated flow except up to 10% of the length may be on marginal pasture to stabilize an outlet. May be expanded up to 2X the design width if such expansion is requested by the producer and will result in water quality improvements. Maximum 100 foot width. Cannot be pastured or cropped.

- ***Wetland Restoration (CP23):*** Practice used to restore hydrology to degraded wetlands on both cropland and marginal pasture. Cost share assistance available for earthmoving, tree planting, and other associated components. Cost share assistance of 75% available for cropped wetland areas. Practice must be located within the CREP contract area. The CREP contract area cannot be delineated or expanded to specifically accommodate CP23.

Funding Limitations of Certain CREP Associated Agricultural Components

- ***Water Systems (CP21 & 22):*** Cost share limitations include $3,000 for all water developments per contract. Maximum $2,000 for water source developments (pond, spring or well), $2,000 for water supply pipelines, and $2,000 for water facilities (tank, trough, fencing, plumbing).
- ***Fencing (CP21 & CP22):*** Maximum cost share is the established cost for a 4-strand barbed wire fence.
- ***Livestock Crossing (CP21 & CP22):*** Maximum cost share is $1,500 per contract.

Note: A complete list of CREP eligible agricultural components is contained in the 2CRP Manual.

Appendix A

303d List of Impaired Waters
Impaired Waters Listed Due to Agricultural Runoff
10/25/04

Basin 2 – Poultney-Mettowee

Mettowee River, upstream from VT/NY border (2.8 miles)	temperature
Poultney River, from Carvers Falls up to Castleton River (2.8 miles)	nutrients
Poultney River, 0.5 miles above Castleton River to 0.5 miles below	nutrients

Basin 3 – Otter Creek

Otter Creek, below mouth of Middlebury River to Weybridge dam (6 miles)	E.coli
Lewis Creek, from lower covered bridge upstream to footbridge (12.3 miles)	E.coli
Little Otter Creek, lower, from mouth upstream (9 miles)	E.coli, undefined
Little Otter Creek, upper, from river mile 15.4 to 16.4	E.coli, undefined
Pond Brook, from Lewis Creek upstream (1.5 miles)	E.coli
Middlebury River, from mouth upstream (1.5 miles)	E.coli

Basin 5 – northern Lake Champlain

LaPlatte River from Hinesburg down to mouth (10.5 miles)	E.coli
Mud Hollow Brook, from mouth upstream (3 miles)	E.coli
Rock River, from mouth to VT/QUE border (3.6 miles)	undefined
Rock River, upstream from VT/QUE border (13 miles)	undefined
Saxe Brook (trib to Rock) from mouth upstream 1 mile	undefined
Jewett Brook (3.5 miles)	sediment, nutrients, E.coli

Mill River, from St Albans Bay upstream (1.8 miles)	sediment, nutrients, E.coli
Rugg Brook, from mouth upstream (4.3 miles)	E.coli, undefined
Stevens Brook, from mouth upstream (6.8 miles)	sediment, nutrients, E.coli
Stone Bridge Brook, from mouth upstream 2 miles	undefined

Basin 6 - Missisquoi

Berry Brook up to North Tributary (mouth to 1 mile upstream)	sediment, nutrients, E.coli
Godin Brook	sediment, nutrients, E.coli
Samsonville Brook	sediment, nutrients, E.coli
Trout Brook, from mouth upstream (2.3 miles)	undefined
Chester Brook	undefined
Wanzer Brook	undefined
Coburn Brook	nutrients
Mud Creek, from river mile 6.5 downstream to VT/QUE border	undefined
Taft Brook in Troy, from mouth upstream 0.1 mile	nutrients

Basin 8 - Winooski

Folsom Brook	E.coli

Basin 13 – lower CT River

Newton Brook, from mouth upstream (2 miles)	sediment

Basin 14 – Waits, Wells, Ompompanoosuc

Tributary to Tabor Branch, from mouth upstream (0.1 mile)	undefined

Basin 17 - Lake Memphremagog

Crystal Brook in Derby (0.3 mile)	sediment, nutrients
Tributary to Stearns Brook (Holland)	undefined