



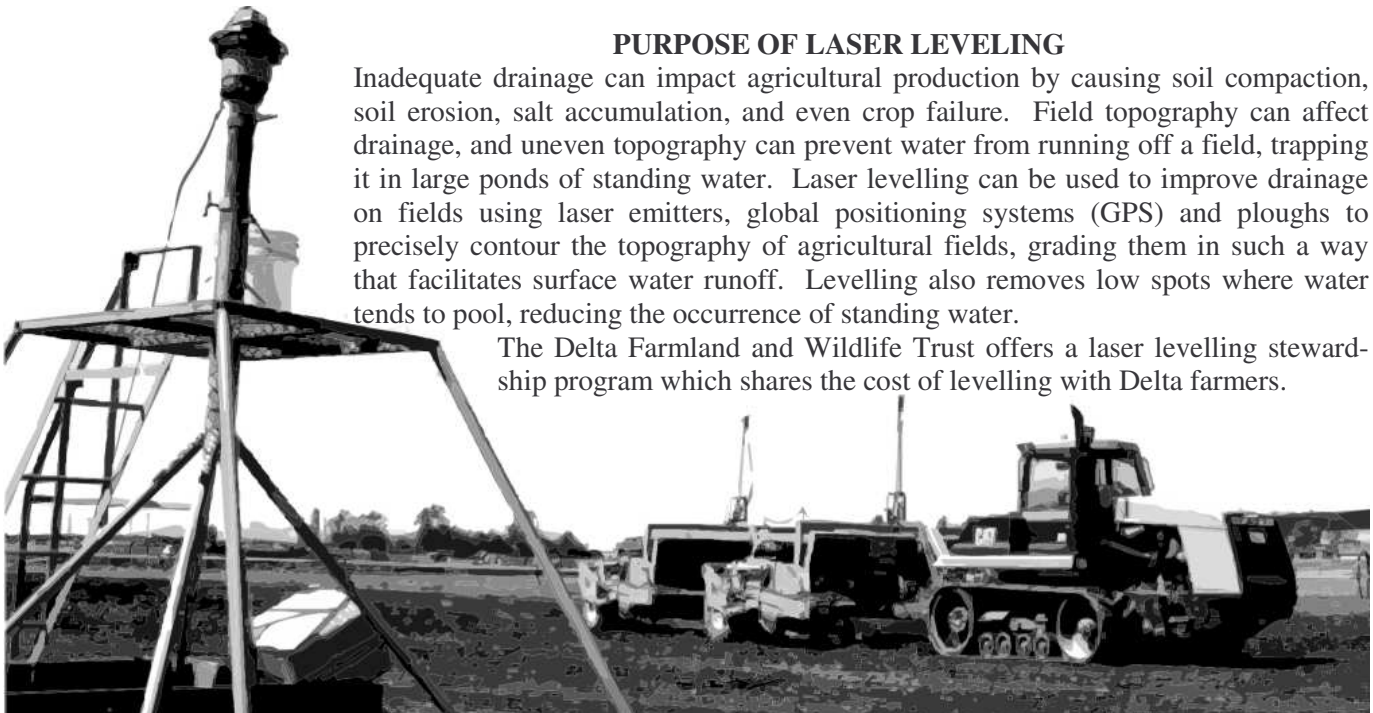
Delta Farmland & Wildlife Trust

LAND LASER LEVELING: Program Overview and Co-operator Guidelines

PURPOSE OF LASER LEVELING

Inadequate drainage can impact agricultural production by causing soil compaction, soil erosion, salt accumulation, and even crop failure. Field topography can affect drainage, and uneven topography can prevent water from running off a field, trapping it in large ponds of standing water. Laser levelling can be used to improve drainage on fields using laser emitters, global positioning systems (GPS) and ploughs to precisely contour the topography of agricultural fields, grading them in such a way that facilitates surface water runoff. Levelling also removes low spots where water tends to pool, reducing the occurrence of standing water.

The Delta Farmland and Wildlife Trust offers a laser levelling stewardship program which shares the cost of levelling with Delta farmers.



REASONS TO INVEST IN LASER LEVELING

There are several reasons to invest in laser leveling. Standing water that collects on unlevelled fields causes soil compaction, making it more difficult to plough and till. Compaction also inhibits plant growth by acting as a physical barrier to plant roots during the growing season.

When standing water evaporates, it can draw salts from deep in the soil profile to the surface, resulting in conditions that can negatively affect their growth. The effect of standing water can easily be observed in growing crops; plants growing in low areas tend to be stunted compared to the neighbouring vegetation.

Excess water associated with ponding can waterlog soils and inundate the root zones of over wintering crops. Water in the root zone reduces the amount of oxygen available to the roots and can cause the build up of toxic compounds. Under these conditions, plants become weakened and are more susceptible to disease. Eventually, standing water can result in crop failure, especially in over-wintering crops like perennial forage and cover crops. Standing water can also attract waterfowl, which may further damage grass crops by grazing them.

Finally, poor drainage can delay access to fields in spring. Soils take longer to dry when standing water is present, and there are several reasons why farmers should avoid working wet soils. First, wet soils tend to clump together when ploughed or tilled, creating an unfavourable soil structure that requires additional tillage before planting. Second, wetter soils are more prone to compaction by farm equipment.

It is important that soils are allowed to dry adequately before spring work begins, but waiting for poorly drained fields to dry can cause delays that continue throughout the growing season. A delay in planting means harvest is delayed, increasing the risk that fall rain will prevent harvest. The risk of leaving crops unharvested is compounded by the fact that poorly drained fields become unworkable earlier in the fall compared to better drained ones. Delayed harvests can also reduce the opportunity to plant winter cover crops, which improve soil fertility and reduce soil erosion, as well as provide foraging habitat for migratory waterfowl.

CONTOURING OPTIONS FOR LASER LEVELLING

Laser leveled fields can be contoured in 3 different ways; sloped, crowned or dead levelled. The effectiveness of each method depends on individual field conditions. Farmers should evaluate their fields to decide which method will optimize drainage.

Sloped fields are leveled to be high at one edge of the field, and the soil surface is sloped towards a ditch to allow for directional runoff (Fig. 1). The low end of the field is usually adjacent to a drainage ditch that collects and removes the runoff water. Crowned fields are similar, but the highest point of the field is located in the middle, allowing water to runoff both sides into

drainage ditches (Fig. 2). While both sloping and crowning increase surface water runoff, fine soil particles can be washed away by the runoff, contributing to soil erosion. Dead leveled fields have no or negligible slope, which minimizes soil erosion and allows water to infiltrate into the soil evenly (Fig. 3).

Each of these contouring methods can be combined with subsoil drainage tiles to increase drainage of water that infiltrates the soil. Given that water infiltrates the soil on dead leveled fields and does not runoff, subsoil drainage tiles should be seriously considered.

Fig. 1: Sloped Contour

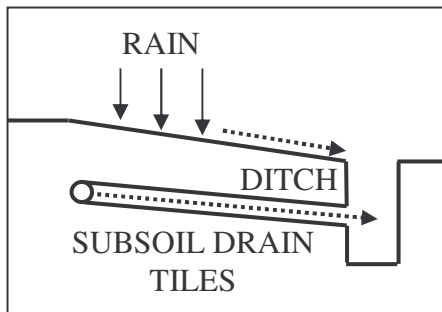


Fig. 2: Crowned Contour

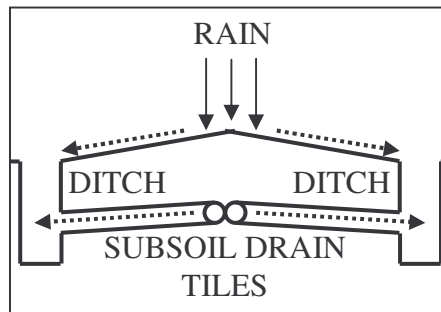
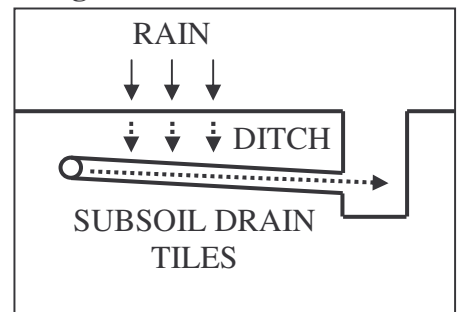


Fig. 3: Dead Level Contour



Solid lines represent rain; dashed lines represent runoff/drainage water. Where water runs over land, fine soil particles may be washed away. Note that not all fields are equipped with subsoil drain tiles.

COMPREHENSIVE DRAINAGE PLANS ARE IMPORTANT

When deciding how to address drainage problems, consider all of the factors that may influence drainage. Laser leveling can be an effective tool for improving surface runoff but it does not address all drainage problems. Water may still infiltrate the soil on laser leveled fields, causing water logging. Subsoil drainage tiles can improve drainage of water that has infiltrated the soil, and can also speed the drainage of standing water. Additionally, subsoil drainage

can help remove soil salts by dissolving and flushing them away as the water drains through the tiles. Although it can provide good drainage, installing subsoil drainage is a costly management practice. It can also become ineffective if the ditches that the tiles drain into fill with water or the drain tiles become filled with sediments.

LASER LEVELING GUIDELINES AND REQUIREMENTS

Farmers in Delta can participate in the DF&WT laser leveling program by applying to our Laser Leveling cost share program. Co-operators in the program will be reimbursed, to 50% of the cost of laser levelling, up to a maximum of \$125/acre. A maximum of 50 acres, per producer, is eligible for cost sharing. Work may be completed by levelling contractor. Producers who complete the levelling themselves must include an estimate from a third-party laser leveling contractor with their application. Laser leveling must be completed by October 31 of the

current program year and agreements must arrive at the DF&WT office by November 16 of the current program year. A copy of the contractors estimate/invoice must be submitted before agreements will be approved and signed by DF&WT. The laser leveling program may not be used to spread and/or level material foreign to the field(s). DF&WT Laser Leveling Program Agreements and additional information are available at the DF&WT office.

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Delta Farmland & Wildlife Trust is a non-profit, charitable society whose mission is to promote the preservation of farmland and associated wildlife habitat on the Fraser River delta through sustainable farming and land stewardship.

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