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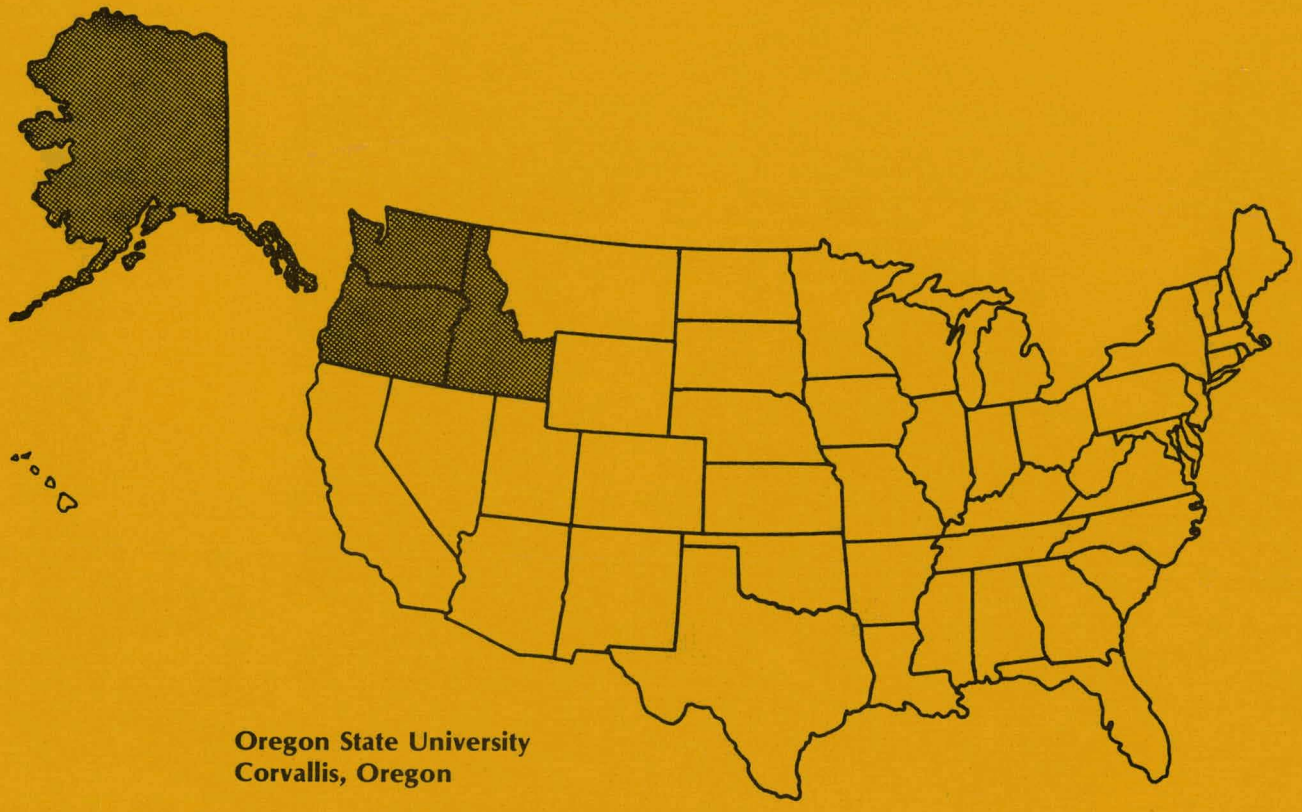
# Supplemental Report: Energy and Water Consumption of Pacific Northwest Irrigation Systems

August 1978



**Oregon State University**
**Corvallis, Oregon**

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**Task Agreement No. 25**

**In cooperation with**

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Supplemental Report

to

# ENERGY AND WATER CONSUMPTION OF PACIFIC NORTHWEST IRRIGATION SYSTEMS

by

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Corvallis, Oregon

June 1978

PREPARED FOR THE

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Through

BATTELLE PACIFIC NORTHWEST LABORATORIES

## ABSTRACT

This supplement provides a revised estimate of the design energy and water requirements of various irrigation systems utilized in the Pacific Northwest states of Idaho, Oregon and Washington. It is intended to provide interested readers information concerning sources of irrigation water, along with the water and energy requirements of the major types of irrigation systems used throughout the region. Revisions were made to update portions of the primary data deck and to correct errors discovered in the original data deck. These revisions have resulted in a reduction in the total regional energy requirements for irrigated agriculture by approximately 7 percent. Decreases occurred in the states of Idaho and Washington, while Oregon demonstrated an increase. Water requirements for regional irrigated agriculture were increased by 3 percent; all of this increase occurred in the state of Washington. Slight changes in the acreages irrigated by each type of irrigation system were noted, but are insignificant.

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## ACKNOWLEDGMENTS

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## GLOSSARY OF TERMS

Below is a list of technical expressions, in alphabetical order, frequently used throughout this report. Definition of these expressions should clarify the intentions of the authors and aid the reader in his understanding of the material.

| | |
|---|---|
| Combined pumping lift | The weighted average on-farm pumping lift, in feet, of all water used for irrigation purposes. |
| Design requirements | The water application and energy consumption to supply adequate water to irrigated crops eight out of ten years. |
| Diversion pumping | The pumping of irrigation water into community conveyance systems. In some cases, the quantity of water pumped in a subarea may exceed the water applied because some of the water may be relifted (pumped) more than once. At the point of delivery, the individual farmer may either repump the water into his irrigation system or obtain the water by gravity diversion. |
| Ground water pumping lift | The weighted average lift, in feet, to bring water from the aquifer to the field level. |
| Ground water sources | Irrigation water obtained from underground aquifers. |
| On-farm energy consumption | The energy consumption, in kilowatt hours per acre (kWh/ac) or megawatt hours (MWh), required by individual farmers to pump irrigation water. |
| Surface water pumping lifts | The weighted average lift, in feet, to bring water from a surface source to the field level. |

| | |
|---|---|
| Surface water sources | Irrigation water obtained from lakes, springs, streams or community conveyance systems. |
| Total energy consumption | The energy consumption, in kilowatt hours per acre (kWh/ac) or megawatt hours (MWh), required in the subarea, subregion or state to pump irrigation water. |
| Water application | The total water applied by an irrigation system(s) to meet the gross water requirements of the crops. |

# INTRODUCTION

Irrigated crop production in the Pacific Northwest states of Idaho, Oregon and Washington is dependent upon water and energy. Historically, both these resources have been readily available to farmers within the region. However, for the last several years, most notably in the drought year of 1977, this trend has been reversed. Increased competition for both water and energy has decreased the availability of these vital resources for use in regional crop production.

Because of increased competition, intense interest has developed in the region concerning water and energy requirements of irrigated agriculture. Since total water and energy requirements are related to types of irrigation technologies used, knowledge of the types and extent of each technology is necessary to determine water and energy use relationships.

Forty-five subareas within 14 subregions have been identified in Idaho, Oregon and Washington in order to study these relationships. Data have been tabulated for each subarea, subregion and state by irrigation system and irrigation water source. Water and energy requirements have been identified for the following nine types of systems representing irrigation technologies in the Pacific Northwest:

1. Center pivot sprinkler systems
2. Hand move sprinkler systems
3. Side roll sprinkler systems
4. Solid set removable sprinkler systems
5. Permanent sprinkler systems

6. Big gun sprinkler systems
7. Gravity irrigation systems: siphon tube and flood
8. Pump back irrigation systems
9. Drip and trickle irrigation systems

Determination of energy consumed by irrigation requires both a knowledge of the types of systems in use and the methods of obtaining irrigation water. Water may be acquired from the following sources: wells (groundwater), streams and gravity diversion canals (surface water), and canals or closed conduits supplied by pumped diversions (either ground or surface water sources). Pumped diversions also occur where water in a gravity diversion system is relifted to higher elevations to increase utilization.

Irrigation methods can be partitioned into two broad categories: surface systems and sprinkler systems. Surface systems generally transport water from the source to the field in either an open ditch, which may or may not be lined with an impermeable material, or through closed conduits. Water is then applied to fields using any of a variety of surface irrigation techniques which necessitate wetting all or part of the field surface. Some users of surface systems recover runoff from fields by pumping water back to a higher elevation for reuse; such systems are known as pump back (return-recovery) systems. Approximately 43 million acres are surface-irrigated in the United States, of which 4.1 million acres are in the Pacific Northwest.

Sprinkler irrigation systems differ from surface systems in that water is distributed via pressurized sprinklers. There are seven basic types of pressurized systems ranging in operating pressure from over 100 psi for big gun and some center pivot to less than 10 psi for drip. These systems collectively irrigated over 17.6 million acres in the United States, of which 3.4 million acres are in the Pacific Northwest. The approximate U. S. and regional acreages for each of these systems are as follows:

| System | United States (acres) | Pacific Northwest (acres) |
|---|---|---|
| Hand move | 3,800,000 | 1,360,000 |
| Center pivot | 6,700,000 | 650,000 |
| Side roll | 3,500,000 | 1,200,000 |
| Solid set and Permanent | 770,000 | 140,000 |
| Big gun | 1,300,000 | 38,000 |
| Drip | 180,000 | 3,300 |
| Unenumerated* | 1,500,000 | --- |

*Irrigated acreages not differentiated by system.

## IRRIGATION SYSTEM DESCRIPTIONS

### Hand Move

The hand move system is typically hand-assembled for a particular irrigation set, operated for approximately 10 hours, then disassembled and transported by human labor roughly 50 feet across the field for reassembly and operation at the next set. This method requires sprinkler operating pressures of approximately 50 psi and a significant amount of human labor.

### Side Roll

The side roll system is similar to the hand move except that wheels are installed on the laterals, with the pipe serving as the axle. This allows the laterals to be rapidly rolled from one irrigation set to the next by a mechanical mover. This system reduces labor requirements about 50 percent. Sprinkler operating pressures of 50 psi are common for side roll.

### Solid Set

The solid set system is designed to irrigate an entire area without being moved, therefore requiring a large number of pipes and sprinklers. Laterals are positioned on approximately 40 x 50 foot spacings across a field. To facilitate harvest, this set-up is usually disassembled after the last irrigation. Little labor is required other than for initial set-up and final disassembly. Sprinkler operating pressures are around 50 psi.

Permanent

The permanent system is similar to solid set except the mainline, laterals and sprinklers are permanently installed. Supply lines and laterals are buried; in many cases, the complete system is controlled by an electronic clock. This method requires only a minimum of labor for maintenance. Operating pressures are approximately 50 psi.

Big Gun

The big gun system is designed to reduce both labor and initial investment by using large sprinklers and nozzles. Large sprinklers may be stationary during operation, or may be mounted on trailers, continuously moving while they irrigate. These are called travelers. These systems can require operating pressures in excess of 100 psi.

Center Pivot

The center pivot system utilizes one lateral to irrigate a circular field of 126 acres or more, requiring a minimum of labor, and using sprinkler operating pressures between 70 and 90 psi. It is adapted primarily to high intake rate soils.

Drip/Trickle

The drip system is a network of small tubes which distribute water to individual plants at low pressure on a daily basis. This technique requires large quantities of plastic, polyethylene

or PVC tubing, which is usually installed directly below the ground surface. Drip has low labor requirements and a high potential water application efficiency; in addition, this system can provide water to areas otherwise totally impossible to irrigate. Plugging of individual drippers, holes or emitters is a major problem. However, drip irrigation technology is still evolving and research is continuing to solve many of the existing problems.

All of the previously described irrigation systems are used throughout the region, which encompasses the three contiguous states of Idaho, Washington and Oregon. The region is partitioned into 45 drainage basins shown in Figure 1. Thirty-six of the drainage basins are contained entirely within one of the three states (Idaho - 14; Oregon - 14; Washington - 8). In addition, nine drainage basins are shared between two states: three between Idaho and Oregon, three between Idaho and Washington, and three between Oregon and Washington.

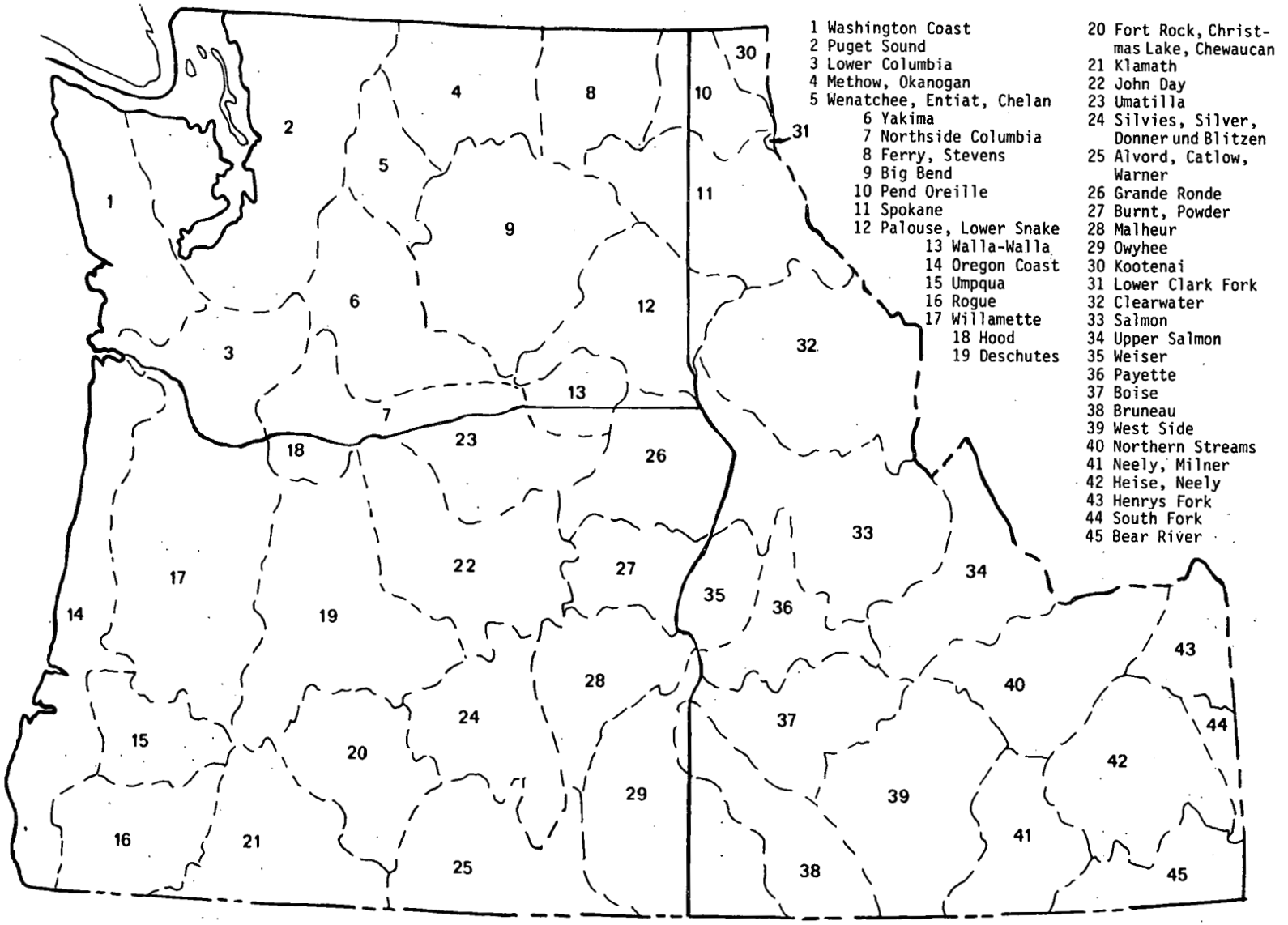


Figure 1. Map of Washington, Oregon and Idaho, partitioned into 45 drainage basins.

## PROCEDURE

Levels of irrigation development in the subareas, subregions and states of the Pacific Northwest and the method of calculating associated water and energy requirements were previously presented by King et al. (1977). This report recalculates the energy consumption and water requirements by irrigation system rather than by crop category. Also included is a breakdown of water and energy requirements by state and portions of subareas (or subregions) where they cross state boundaries.

When dividing a subarea (or subregion) to find the corresponding energy and water requirements for the included state, it is assumed that the per-acre water application and per-acre energy consumption for each irrigation system are the same in all portions of the subarea (or subregion). Although this procedure overlooks the difference in lifts and system mixes of the individual state fractions when compared to those of the entire subarea (or subregion), it does provide an adequate breakdown of water and energy requirements by state.

Subregional and state weighted average lifts were determined from the subareal lifts presented by King et al. (1977). To obtain these weighted average lifts, the subareal average lifts are weighted on total water applied, as shown in Equation 1.

$$\text{Average lift} = \frac{\Sigma \text{ (acres x acre-feet/acre x lift)}}{\Sigma \text{ (acres x acre-feet/acre)}} \qquad (1)$$

where: acres = the acreage irrigated by a specific irrigation system for a given crop

acre-feet/acre = the water applied for the same irrigation system and crop

lift = the on-farm lift, feet, required to deliver irrigation water from the source to the field level in the subarea; this does not include operating pressure

Water application and on-farm energy consumption for each irrigation system, subarea, subregion and state are weighted on acreaged irrigated, as shown by Equations 2 and 3.

$$\text{Average water application} = \frac{\Sigma \text{ (acres x acre-feet/acre)}}{\Sigma \text{ (acres)}} \quad (2)$$

$$\text{Average energy consumed} = \frac{\Sigma \text{ acres x kWh/acre)}}{\Sigma \text{ (acres)}} \quad (3)$$

where: acres = the acreage irrigated by a specific irrigation system for a given crop

acre-feet/acre = the water applied for the same irrigation system and crop

kWh/acre = the electricity consumed, kilowatt hours per acre, for the same irrigation system and crop

Total farm energy consumption, total energy consumption and average total energy consumption are calculated as shown in Equations 4, 5 and 6.

$$\text{Total on-farm energy} = \frac{\text{kWh/acre x acres}}{1000} \quad (4)$$

$$\text{Total energy consumption} = MWh_1 + MWh_2 \quad (5)$$

$$\text{Average total energy consumption} = \frac{MWh}{\text{acres}} \times 1000 \quad (6)$$

where: kWh/ac = the average on-farm energy consumption, kilowatt hours per acre

MWh = the total energy consumption, megawatt hours

$MWh_1$ = the total on-farm energy consumption, megawatt hours

$MWh_2$ = the energy requirements for diversion pumping, megawatt hours

The subareal (or subregional) tables include a combined lift figure which, in addition to the ground and surface water lift values, is the overall weighted average pumping lift. These lifts are determined in the same manner as average lift figures, but with the assumption that any gravity-type irrigation system obtaining water from a surface source receives water from a gravity diversion (zero lift). This method of calculation can result in the combined pumping lift being less than either the ground or surface water lifts.

## SUBAREAL, SUBREGIONAL AND STATE RESULTS

Throughout most of the region, 1975 was climatically a wetter and cooler year than the "average irrigation season" (King et al., 1977). This means that for most of the region, water and energy consumed in 1975 would be less than that used in the "average irrigation season." Therefore, engineering design requirements for energy and water have been presented because they are more meaningful than actual 1975 requirements for predicting future irrigation water application and energy consumption. This follows the practice of designing irrigation systems to provide sufficient water during peak periods for eight out of every ten years. From a statistical perspective, this means an irrigation system should be able to deliver adequate quantities of water for crop growth 80 percent of the time. Should adequate quantities of water not be delivered at critical plant growth stages, catastrophic yield reductions could occur.

The complete region encompasses the three contiguous states of Washington, Oregon and Idaho and has been partitioned into 45 drainage basins (subareas shown in Figure 1). All data have been collected and classified by subarea. Subareas have been organized into 14 subregions which are presented in the following tables.

These tables give design water requirements and energy consumption for all subareas, subregions and states in

the region. Tabular results for each subarea contain total irrigated acreage, irrigated acreage by type of irrigation system, and design water application and energy requirements for irrigation systems operated in 1975. Energy consumption is given for both on-farm and off-farm uses, while pumping lifts, water application and sources of irrigation water are presented for on-farm requirements only.

The per-acre energy consumption and water application for a given subarea, subregion or state are overall averages and are representative of an entire subarea, subregion or state. If the assumption is made that these relationships remain constant, approximate energy consumption and water use requirements can be determined for any level of irrigated agricultural development.

The remaining data--identification of irrigation water source and of irrigation techologies in an area--are purely informational. This material has been included to illustrate the varying uses of irrigation technologies throughout the region and their relative water and energy use relationships. Since these relationships are determined by cropping pattern and irrigation technology selection, by crop, they cannot be used to determine the energy requirements or water application rates for a given type of irrigation technology. Energy and water requirements for individual irrigation technologies were calculated as previously described in the Procedure section of this report.

TABLE 1: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho, Washington Subregion: 1 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 19,873 | 15,241 | 35,114 | 2.2 | 1,038.7 |
| Side Roll | 6,740 | 3,450 | 10,190 | 2.0 | 1,001.8 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | 262 | 574 | 836 | 1.9 | 1,265.9 |
| Gravity Systems | 3,200 | 3,410 | 6,610 | 3.7 | 538.0 |
| Return Recovery | | | | | |
| Drip/Trickle | 100 | | 100 | 1.7 | 501.8 |
| TOTAL | 30,175 | 22,675 | 52,850 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 157 |
| Surface Water Lift (ft) | 48 |
| Combined Lift (ft) | 101 |
| Average Rate of Water Application (acft/ac) | 2.3 |
| Average On Farm Energy Consumption (kWh/ac) | 971.5 |
| Total On Farm Energy Consumption (MWh) | 51,346 |
| Energy Consumption for Diversion Pumping (MWh) | 9,214 |
| Total Energy Consumption (MWh) | 60,560 |
| Average Total Energy Consumption (kWh/ac) | 1,145.9 |

*Subregion 1 includes subareas Pend Oreille, Spokane, Kootenai, and Lower Clark Fork.

TABLE 1A: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 1 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 9,773 | 12,091 | 21,864 | 2.2 | 1,021.0 |
| Side Roll | 1,040 | 1,400 | 2,440 | 2.0 | 959.0 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | 62 | 574 | 636 | 1.7 | 1,105.4 |
| Gravity Systems | | 110 | 110 | 3.3 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 10,875 | 14,175 | 25,050 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 170 |
| Surface Water Lift (ft) | 18 |
| Average Rate of Water Application (acft/ac) | 2.2 |
| Average On Farm Energy Consumption (kWh/ac) | 1,012.6 |
| Total On Farm Energy Consumption (MWh) | 25,365 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 25,365 |
| Average Total Energy Consumption (kWh/ac) | 1,012.6 |

*Subregion 1, Idaho, includes Idaho portions of subareas Pend Oreille and Spokane along with subareas Kootenai and Lower Clark Fork.

TABLE 1B: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 1 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 10,100 | 3,150 | 13,250 | 2.2 | 1,067.9 |
| Side Roll | 5,700 | 2,050 | 7,750 | 2.0 | 1,015.3 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | 200 | | 200 | 2.3 | 1,776.2 |
| Gravity Systems | 3,200 | 3,300 | 6,500 | 3.7 | 547.1 |
| Return Recovery | | | | | |
| Drip/Trickle | 100 | | 100 | 1.7 | 501.8 |
| TOTAL | 19,300 | 8,500 | 27,800 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 150 |
| Surface Water Lift (ft) | 97 |
| Average Rate of Water Application (acft/ac) | 2.5 |
| Average On Farm Energy Consumption (kWh/ac) | 934.5 |
| Total On Farm Energy Consumption (MWh) | 25,980 |
| Energy Consumption for Diversion Pumping (MWh) | 9,214 |
| Total Energy Consumption (MWh) | 35,194 |
| Average Total Energy Consumption (kWh/ac) | 1,266.0 |

*Subregion 1, Washington, includes Washington portions of subareas Pend Oreille and Spokane.

TABLE 1-1: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho, Washington Subregion: 1 Subarea: Pend Oreille

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 100 | 2,326 | 2,426 | 2.0 | 672.1 |
| Side Roll | | 490 | 490 | 2.0 | 693.3 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | 324 | 324 | 1.6 | 986.7 |
| Gravity Systems | 200 | 360 | 560 | 2.9 | 293.6 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 300 | 3,500 | 3,800 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 150 |
| Surface Water Lift (ft) | 27 |
| Combined Lift (ft) | 35 |
| Average Rate of Water Application (acft/ac) | 2.1 |
| Average On Farm Energy Consumption (kWh/ac) | 645.9 |
| Total On Farm Energy Consumption (MWh) | 2,454 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 2,454 |
| Average Total Energy Consumption (kWh/ac) | 645.9 |

TABLE 1-1A: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 1 Subarea: Pend Oreille

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | | 2,176 | 2,176 | 2.0 | 672.1 |
| Side Roll | | 440 | 440 | 2.0 | 693.3 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | 324 | 324 | 1.6 | 986.7 |
| Gravity Systems | | 60 | 60 | 2.9 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 0 | 3,000 | 3,000 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 0 |
| Surface Water Lift (ft) | 25 |
| Average Rate of Water Application (acft/ac) | 2.0 |
| Average On Farm Energy Consumption (kWh/ac) | 695.7 |
| Total On Farm Energy Consumption (MWh) | 2,087 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 2,087 |
| Average Total Energy Consumption (kWh/ac) | 695.7 |

TABLE 1-1B: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 1 Subarea: Pend Oreille

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 100 | 150 | 250 | 2.0 | 672.1 |
| Side Roll | | 50 | 50 | 2.0 | 693.3 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | 200 | 300 | 500 | 2.9 | 328.8 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 300 | 500 | 800 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 150 |
| Surface Water Lift (ft) | 50 |
| Average Rate of Water Application (acft/ac) | 2.6 |
| Average On Farm Energy Consumption (kWh/ac) | 458.9 |
| Total On Farm Energy Consumption (MWh) | 367 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 367 |
| Average Total Energy Consumption (kWh/ac) | 458.9 |

TABLE 1-2: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho, Washington Subregion: 1 Subarea: Spokane

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 19,773 | 12,107 | 31,880 | 2.2 | 1,075.5 |
| Side Roll | 6,740 | 2,960 | 9,700 | 2.0 | 1,017.4 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | 262 | 58 | 320 | 2.3 | 1,776.2 |
| Gravity Systems | 3,000 | 3,050 | 6,050 | 3.8 | 560.6 |
| Return Recovery | | | | | |
| Drip/Trickle | 100 | | 100 | 1.7 | 501.8 |
| TOTAL | 29,875 | 18,175 | 48,050 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 157 |
| Surface Water Lift (ft) | 52 |
| Combined Lift (ft) | 107 |
| Average Rate of Water Application (acft/ac) | 2.4 |
| Average On Farm Energy Consumption (kWh/ac) | 1,002.6 |
| Total On Farm Energy Consumption (MWh) | 48,167 |
| Energy Consumption for Diversion Pumping (MWh) | 9,214 |
| Total Energy Consumption (MWh) | 57,381 |
| Average Total Energy Consumption (kWh/ac) | 1,194.2 |

TABLE 1-2A: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 1 Subarea: Spokane

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 9,773 | 9,107 | 18,880 | 2.2 | 1,075.5 |
| Side Roll | 1,040 | 960 | 2,000 | 2.0 | 1,017.4 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | 62 | 58 | 120 | 2.3 | 1,776.2 |
| Gravity Systems | | 50 | 50 | 3.8 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 10,875 | 10,175 | 21,050 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 170 |
| Surface Water Lift (ft) | 15 |
| Average Rate of Water Application (acft/ac) | 2.2 |
| Average On Farm Energy Consumption (kWh/ac) | 1,071.4 |
| Total On Farm Energy Consumption (MWh) | 22,553 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 22,553 |
| Average Total Energy Consumption (kWh/ac) | 1,071.4 |

TABLE 1-2B: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 1 Subarea: Spokane

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 10,000 | 3,000 | 13,000 | 2.2 | 1,075.5 |
| Side Roll | 5,700 | 2,000 | 7,700 | 2.0 | 1,017.4 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | 200 | | 200 | 2.3 | 1,776.2 |
| Gravity Systems | 3,000 | 3,000 | 6,000 | 3.8 | 565.3 |
| Return Recovery | | | | | |
| Drip/Trickle | 100 | | 100 | 1.7 | 501.8 |
| TOTAL | 19,000 | 8,000 | 27,000 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 150 |
| Surface Water Lift (ft) | 100 |
| Average Rate of Water Application (acft/ac) | 2.5 |
| Average On Farm Energy Consumption (kWh/ac) | 948.6 |
| Total On Farm Energy Consumption (MWh) | 25,613 |
| Energy Consumption for Diversion Pumping (MWh) | 9,214 |
| Total Energy Consumption (MWh) | 34,827 |
| Average Total Energy Consumption (kWh/ac) | 1,289.9 |

TABLE 1-3: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 1 Subarea: Kootenai

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | | 808 | 808 | 2.1 | 686.0 |
| Side Roll | | | | | |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | 192 | 192 | 1.5 | 886.5 |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 0 | 1,000 | 1,000 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 0 |
| Surface Water Lift (ft) | 25 |
| Combined Lift (ft) | 25 |
| Average Rate of Water Application (acft/ac) | 2.0 |
| Average On Farm Energy Consumption (kWh/ac) | 724.5 |
| Total On Farm Energy Consumption (MWh) | 724 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 724 |
| Average Total Energy Consumption (kWh/ac) | 724.5 |

TABLE 1-4: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 1 Subarea: Lower Clark Fork

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | | | | | |
| Side Roll | | | | | |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 0 | 0 | 0 | | |

| | |
|---|---|
| Ground Water Lift (ft) | |
| Surface Water Lift (ft) | |
| Combined Lift (ft) | |
| Average Rate of Water Application (acft/ac) | |
| Average On Farm Energy Consumption (kWh/ac) | |
| Total On Farm Energy Consumption (MWh) | |
| Energy Consumption for Diversion Pumping (MWh) | |
| Total Energy Consumption (MWh) | |
| Average Total Energy Consumption (kWh/ac) | |

TABLE 2: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 2 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 105,000 | 27,200 | 132,200 | 2.4 | 1,200.9 |
| Hand Move | 10,500 | 61,740 | 72,240 | 4.2 | 1,821.8 |
| Side Roll | 27,695 | 247,998 | 275,693 | 3.3 | 1,428.3 |
| Solid Set | 5,000 | 15,000 | 20,000 | 4.5 | 1,946.1 |
| Permanent | 1,000 | 19,000 | 20,000 | 5.7 | 2,813.8 |
| Big Gun | 500 | 1,200 | 1,700 | 3.8 | 2,595.5 |
| Gravity Systems Return Recovery | | 244,667 | 244,667 | 5.9 | 0.0 |
| Drip/Trickle | | 900 | 900 | 4.1 | 1,152.4 |
| TOTAL | 149,695 | 617,705 | 767,400 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 340 |
| Surface Water Lift (ft) | 16 |
| Combined Lift (ft) | 44 |
| Average Rate of Water Application (acft/ac) | 4.2 |
| Average On Farm Energy Consumption (kWh/ac) | 1,022.6 |
| Total On Farm Energy Consumption (MWh) | 748,777 |
| Energy Consumption for Diversion Pumping (MWh) | 974,748 |
| Total Energy Consumption (MWh) | 1,759,525 |
| Average Total Energy Consumption (kWh/ac) | 2,292.8 |

*Subregion 2 includes subareas Methow, Okanogan; Wenatchee, Entiat, Chelan; Ferry Stevens; and Big Bend.

TABLE 2-1: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 2 Subarea: Methow, Okanogan

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | 200 | 200 | 3.7 | 1,839.6 |
| Hand Move | | 10,000 | 10,000 | 5.0 | 2,094.6 |
| Side Roll | | 5,300 | 5,300 | 4.5 | 1,915.5 |
| Solid Set Permanent | | 10,000 | 10,000 | 4.8 | 2,044.7 |
| Big Gun | | 200 | 200 | 5.2 | 3,577.1 |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | | 300 | 300 | 3.8 | 878.1 |
| TOTAL | 0 | 26,000 | 26,000 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 0 |
| Surface Water Lift (ft) | 75 |
| Combined Lift (ft) | 75 |
| Average Rate of Water Application (acft/ac) | 4.8 |
| Average On Farm Energy Consumption (kWh/ac) | 2,034.3 |
| Total On Farm Energy Consumption (MWh) | 52,893 |
| Energy Consumption for Diversion Pumping (MWh) | 4,662 |
| Total Energy Consumption (MWh) | 57,555 |
| Average Total Energy Consumption (kWh/ac) | 2,213.7 |

TABLE 2-2: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 2 Subarea: Wenatchee, Entiat, Chelan

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | | 9,740 | 9,740 | 5.5 | 2,729.4 |
| Side Roll | | 1,660 | 1,660 | 3.6 | 1,813.0 |
| Solid Set Permanent | | 18,000 | 18,000 | 5.6 | 2,826.6 |
| Big Gun | | | | | |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | | 600 | 600 | 4.3 | 1,289.5 |
| TOTAL | 0 | 30,000 | 30,000 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 0 |
| Surface Water Lift (ft) | 114 |
| Combined Lift (ft) | 114 |
| Average Rate of Water Application (acft/ac) | 5.5 |
| Average On Farm Energy Consumption (kWh/ac) | 2,708.2 |
| Total On Farm Energy Consumption (MWh) | 81,247 |
| Energy Consumption for Diversion Pumping (MWh) | 31,181 |
| Total Energy Consumption (MWh) | 112,428 |
| Average Total Energy Consumption (kWh/ac) | 3,747.6 |

TABLE 2-3: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 2 Subarea: Ferry Stevens

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 500 | 12,000 | 12,500 | 3.4 | 1,376.2 |
| Side Roll | 500 | 6,000 | 6,500 | 3.1 | 1,252.2 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 1,000 | 18,000 | 19,000 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 300 |
| Surface Water Lift (ft) | 50 |
| Combined Lift (ft) | 63 |
| Average Rate of Water Application (acft/ac) | 3.3 |
| Average On Farm Energy Consumption (kWh/ac) | 1,333.8 |
| Total On Farm Energy Consumption (MWh) | 25,342 |
| Energy Consumption for Diversion Pumping (MWh) | 5,605 |
| Total Energy Consumption (MWh) | 30,947 |
| Average Total Energy Consumption (kWh/ac) | 1,628.8 |

TABLE 2-4: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 2 Subarea: Big Bend

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 105,000 | 27,000 | 132,000 | 2.4 | 1,199.9 |
| Hand Move | 10,000 | 30,000 | 40,000 | 3.9 | 1,671.9 |
| Side Roll | 27,195 | 235,038 | 262,233 | 3.3 | 1,420.3 |
| Solid Set | 5,000 | 5,000 | 10,000 | 4.3 | 1,698.0 |
| Permanent | 1,000 | 1,000 | 2,000 | 6.2 | 2,698.0 |
| Big Gun | 500 | 1,000 | 1,500 | 3.6 | 2,464.7 |
| Gravity Systems | | 244,667 | 244,667 | 5.9 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 148,695 | 543,705 | 692,400 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 340 |
| Surface Water Lift (ft) | 5 |
| Combined Lift (ft) | 38 |
| Average Rate of Water Application (acft/ac) | 4.1 |
| Average On Farm Energy Consumption (kWh/ac) | 903.1 |
| Total On Farm Energy Consumption (MWh) | 625,295 |
| Energy Consumption for Diversion Pumping (MWh) | 934,270 |
| Total Energy Consumption (MWh) | 1,559,565 |
| Average Total Energy Consumption (kWh/ac) | 2,252.4 |

TABLE 3: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 3 Subarea: Yakima*

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 220 | 2,180 | 2,400 | 2.9 | 1,128.4 |
| Hand Move | 1,212 | 20,896 | 22,108 | 4.0 | 1,220.8 |
| Side Roll | 2,000 | 41,792 | 43,792 | 3.5 | 1,113.6 |
| Solid Set | 156 | 2,844 | 3,000 | 3.5 | 1,095.6 |
| Permanent | 2,854 | 51,746 | 54,600 | 4.7 | 1,495.7 |
| Big Gun | | 400 | 400 | 3.7 | 2,090.7 |
| Gravity Systems | 19,693 | 376,807 | 396,500 | 5.4 | 133.9 |
| Return Recovery | 1,000 | 1,200 | 2,200 | 3.3 | 764.5 |
| Drip/Trickle | 165 | 835 | 1,000 | 3.6 | 419.2 |
| TOTAL | 27,300 | 498,700 | 526,000 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 250 |
| Surface Water Lift (ft) | 10 |
| Combined Lift (ft) | 14 |
| Average Rate of Water Application (acft/ac) | 5.1 |
| Average On Farm Energy Consumption (kWh/ac) | 417.2 |
| Total On Farm Energy Consumption (MWh) | 219,456 |
| Energy Consumption for Diversion Pumping (MWh) | 33,423 |
| Total Energy Consumption (MWh) | 252,879 |
| Average Total Energy Consumption (kWh/ac) | 480.8 |

*Subregion 3 includes only one subarea--Yakima.

TABLE 4: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 4 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 107,319 | 56,341 | 163,660 | 2.0 | 1,065.4 |
| Hand Move | 369,281 | 150,910 | 520,191 | 2.5 | 1,139.7 |
| Side Roll | 184,338 | 78,311 | 262,649 | 2.6 | 1,232.0 |
| Solid Set | 28,174 | 14,726 | 42,900 | 3.0 | 1,296.7 |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | 248,388 | 1,294,912 | 1,543,300 | 3.5 | 244.3 |
| Return Recovery | 3,000 | 7,000 | 10,000 | 2.3 | 343.0 |
| Drip/Trickle | | | | | |
| TOTAL | 940,500 | 1,602,200 | 2,542,700 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 262 |
| Surface Water Lift (ft) | 9 |
| Combined Lift (ft) | 55 |
| Average Rate of Water Application (acft/ac) | 3.1 |
| Average On Farm Energy Consumption (kWh/ac) | 600.5 |
| Total On Farm Energy Consumption (MWh) | 1,526,956 |
| Energy Consumption for Diversion Pumping (MWh) | 107,337 |
| Total Energy Consumption (MWh) | 1,634,293 |
| Average Total Energy Consumption (kWh/ac) | 642.7 |

*Subregion 4 includes subareas West Side; Northern Streams; Neely, Milner; Heise, Neely; Henry's Fork; South Fork.

TABLE 4-1: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 4 Subarea: West Side

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 21,889 | 31,511 | 53,400 | 2.1 | 870.2 |
| Hand Move | 23,823 | 32,777 | 56,600 | 2.7 | 902.6 |
| Side Roll | 15,252 | 21,948 | 37,200 | 2.7 | 922.3 |
| Solid Set Permanent | 9,348 | 13,452 | 22,800 | 3.0 | 1,016.9 |
| Big Gun | | | | | |
| Gravity Systems | 6,588 | 509,412 | 516,000 | 3.6 | 28.4 |
| Return Recovery | 3,000 | 5,000 | 8,000 | 2.3 | 411.9 |
| Drip/Trickle | | | | | |
| TOTAL | 79,900 | 614,100 | 694,000 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 200 |
| Surface Water Lift (ft) | 6 |
| Combined Lift (ft) | 41 |
| Average Rate of Water Application (acft/ac) | 3.4 |
| Average On Farm Energy Consumption (kWh/ac) | 249.3 |
| Total On Farm Energy Consumption (MWh) | 173,024 |
| Energy Consumption for Diversion Pumping (MWh) | 65,968 |
| Total Energy Consumption (MWh) | 238,992 |
| Average Total Energy Consumption (kWh/ac) | 344.4 |

TABLE 4-2: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 4 Subarea: Northern Streams

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 6,000 | | 6,000 | 1.7 | 896.4 |
| Hand Move | 53,000 | 8,000 | 61,000 | 2.3 | 1,000.6 |
| Side Roll | 10,000 | | 10,000 | 2.3 | 1,003.8 |
| Solid Set Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | 76,300 | 103,100 | 179,400 | 3.1 | 494.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 145,300 | 111,100 | 256,400 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 200 |
| Surface Water Lift (ft) | 10 |
| Combined Lift (ft) | 85 |
| Average Rate of Water Application (acft/ac) | 2.8 |
| Average On Farm Energy Consumption (kWh/ac) | 643.8 |
| Total On Farm Energy Consumption (MWh) | 165,068 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 165,068 |
| Average Total Energy Consumption (kWh/ac) | 643.8 |

TABLE 4-3: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 4 Subarea: Neely, Milner

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 37,500 | | 37,500 | 2.2 | 1,319.0 |
| Hand Move | 99,629 | 6,871 | 106,500 | 2.7 | 1,448.2 |
| Side Roll | 26,895 | 1,855 | 28,750 | 2.7 | 1,469.0 |
| Solid Set | 18,476 | 1,274 | 19,750 | 3.0 | 1,617.1 |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | 165,500 | 163,000 | 328,500 | 3.7 | 833.4 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 348,000 | 173,000 | 521,000 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 250 |
| Surface Water Lift (ft) | 10 |
| Combined Lift (ft) | 124 |
| Average Rate of Water Application (acft/ac) | 3.3 |
| Average On Farm Energy Consumption (kWh/ac) | 1,058.8 |
| Total On Farm Energy Consumption (MWh) | 551,646 |
| Energy Consumption for Diversion Pumping (MWh) | 17,249 |
| Total Energy Consumption (MWh) | 568,895 |
| Average Total Energy Consumption (kWh/ac) | 1091.9 |

TABLE 4-4: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 4 Subarea: Heise, Neely

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 36,210 | 16,990 | 53,200 | 2.0 | 1,204.3 |
| Hand Move | 150,240 | 53,712 | 203,952 | 2.6 | 1,302.9 |
| Side Roll | 126,200 | 44,298 | 170,498 | 2.6 | 1,326.7 |
| Solid Set | 350 | | 350 | 2.8 | 1,450.8 |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | 376,700 | 376,700 | 3.7 | 0 |
| Return Recovery | | 2,000 | 2,000 | 2.5 | 67.7 |
| Drip/Trickle | | | | | |
| TOTAL | 313,000 | 493,700 | 806,700 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 300 |
| Surface Water Lift (ft) | 10 |
| Combined Lift (ft) | 54 |
| Average Rate of Water Application (acft/ac) | 3.0 |
| Average On Farm Energy Consumption (kWh/ac) | 690.0 |
| Total On Farm Energy Consumption (MWh) | 556,641 |
| Energy Consumption for Diversion Pumping (MWh) | 24,333 |
| Total Energy Consumption (MWh) | 580,973 |
| Average Total Energy Consumption (kWh/ac) | 720.2 |

TABLE 4-5: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 4 Subarea: Henry's Fork

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 5,720 | 7,840 | 13,560 | 1.6 | 662.7 |
| Hand Move | 41,260 | 44,620 | 85,880 | 2.1 | 667.7 |
| Side Roll | 5,420 | 8,140 | 13,560 | 2.1 | 685.6 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | 136,500 | 136,500 | 2.8 | 0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 52,400 | 197,100 | 249,500 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 300 |
| Surface Water Lift (ft) | 15 |
| Combined Lift (ft) | 8 |
| Average Rate of Water Application (acft/ac) | 2.4 |
| Average On Farm Energy Consumption (kWh/ac) | 303.1 |
| Total On Farm Energy Consumption (MWh) | 75,629 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 75,629 |
| Average Total Energy Consumption (kWh/ac) | 303.1 |

TABLE 4-6: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 4 Subarea: South Fork

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 1,329 | 4,930 | 6,259 | 1.7 | 550.9 |
| Side Roll | 571 | 2,070 | 2,641 | 1.7 | 568.1 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | 6,200 | 6,200 | 2.6 | 0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 1,900 | 13,200 | 15,100 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 75 |
| Surface Water Lift (ft) | 15 |
| Combined Lift (ft) | 11 |
| Average Rate of Water Application (acft/ac) | 2.1 |
| Average On Farm Energy Consumption (kWh/ac) | 327.7 |
| Total On Farm Energy Consumption (MWh) | 4,949 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 4,949 |
| Average Total Energy Consumption (kWh/ac) | 327.7 |

TABLE 5: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho, Oregon Subregion: 5 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 11,990 | 3,820 | 15,810 | 2.2 | 986.0 |
| Hand Move | 77,339 | 89,874 | 167,213 | 2.9 | 1,042.2 |
| Side Roll | 33,202 | 47,636 | 80,383 | 2.6 | 915.4 |
| Solid Set | 14,534 | 13,311 | 27,845 | 3.2 | 1,215.1 |
| Permanent | 345 | 213 | 558 | 3.1 | 229.9 |
| Big Gun | | 329 | 329 | 2.6 | 1,109.0 |
| Gravity Systems | 5,307 | 1,018,000 | 1,023,307 | 4.2 | 14.7 |
| Return Recovery | | 5,000 | 5,000 | 2.6 | 70.6 |
| Drip/Trickle | | 17 | 17 | 0.9 | 112.4 |
| TOTAL | 142,717 | 1,177,745 | 1,320,462 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 268 |
| Surface Water Lift (ft) | 13.6 |
| Combined Lift (ft) | 8 |
| Average Rate of Water Application (acft/ac) | 3.9 |
| Average On Farm Energy Consumption (kWh/ac) | 237.6 |
| Total On Farm Energy Consumption (MWh) | 313,709 |
| Energy Consumption for Diversion Pumping (MWh) | 137,153 |
| Total Energy Consumption (MWh) | 450,862 |
| Average Total Energy Consumption (kWh/ac) | 341.4 |

*Subregion 5 includes subareas Malheur; Owyhee; Burnt,Powder; Weiser; Payette; Boise; Bruneau.

TABLE 5A: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 5 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 10,335 | 2,043 | 12,378 | 2.4 | 1,095.0 |
| Hand Move | 68,747 | 66,025 | 134,772 | 3.0 | 1,118.0 |
| Side Roll | 17,579 | 16,888 | 34,467 | 3.1 | 1,188.2 |
| Solid Set | 14,534 | 12,578 | 27,112 | 3.3 | 1,234.7 |
| Permanent | 345 | 213 | 558 | 3.1 | 1,229.9 |
| Big Gun | | | | | |
| Gravity Systems | 5,000 | 683,441 | 688,441 | 4.2 | 21.6 |
| Return Recovery | | 5,000 | 5,000 | 2.6 | 70.6 |
| Drip/Trickle | | | | | |
| TOTAL | 116,540 | 786,188 | 902,728 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 304 |
| Surface Water Lift (ft) | 12 |
| Average Rate of Water Application (acft/ac) | 4.0 |
| Average On Farm Energy Consumption (kWh/ac) | 282.0 |
| Total On Farm Energy Consumption (MWh) | 254,556 |
| Energy Consumption for Diversion Pumping (MWh) | 105,949 |
| Total Energy Consumption (MWh) | 360,505 |
| Average Total Energy Consumption (kWh/ac) | 399.4 |

*Subarea 5, Idaho, includes Idaho portion of Owyhee along with Weiser, Payette, and Idaho portions of Boise and Bruneau.

TABLE 5B: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 5 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 1,655 | 1,777 | 3,432 | 1.4 | 592.8 |
| Hand Move | 8,592 | 23,849 | 32,441 | 2.2 | 726.9 |
| Side Roll | 15,623 | 30,293 | 45,916 | 2.1 | 710.6 |
| Solid Set | | 733 | 733 | 1.5 | 490.1 |
| Permanent | | | | | |
| Big Gun | | 329 | 329 | 1.9 | 1,109.1 |
| Gravity Systems | 307 | 334,559 | 334,866 | 4.1 | 0.6 |
| Return Recovery | | | | | |
| Drip/Trickle | | 17 | 17 | .9 | 112.4 |
| TOTAL | 26,177 | 391,557 | 417,734 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 81 |
| Surface Water Lift (ft) | 17 |
| Average Rate of Water Application (acft/ac) | 3.7 |
| Average On Farm Energy Consumption (kWh/ac) | 141.6 |
| Total On Farm Energy Consumption (MWh) | 59,159 |
| Energy Consumption for Diversion Pumping (MWh) | 30,689 |
| Total Energy Consumption (MWh) | 89,848 |
| Average Total Energy Consumption (kWh/ac) | 215.1 |

*Subregion 5, Oregon, includes subareas Malheur; Oregon portion of Owyhee; Burnt, Powder; and the Oregon portions of Boise and Bruneau.

TABLE 5-1: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 5 Subarea: Malheur

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 960 | 125 | 1,085 | 2.5 | 1,034.7 |
| Hand Move | 214 | 6,185 | 6,399 | 2.4 | 966.9 |
| Side Roll | 4,058 | 4,999 | 9,057 | 3.0 | 1,023.2 |
| Solid Set Permanent | | 122 | 122 | 2.6 | 870.8 |
| Big Gun | | 79 | 79 | 3.3 | 1,948.2 |
| Gravity Systems | 307 | 158,445 | 158,752 | 4.3 | 1.2 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 5,539 | 169,955 | 175,494 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 63 |
| Surface Water Lift (ft) | 25 |
| Combined Lift (ft) | 2 |
| Average Rate of Water Application (acft/ac) | 4.2 |
| Average On Farm Energy Consumption (kWh/ac) | 97.0 |
| Total On Farm Energy Consumption (MWh) | 17,022 |
| Energy Consumption for Diversion Pumping (MWh) | 6,669 |
| Total Energy Consumption (MWh) | 23,691 |
| Average Total Energy Consumption (kWh/ac) | 135.0 |

TABLE 5-2: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon, Idaho Subregion: 5 Subarea: Owyhee

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | 125 | 125 | 1.8 | 718.1 |
| Hand Move | | 2,635 | 2,826 | 2.8 | 869.0 |
| Side Roll | 365 | 2,635 | 3,000 | 2.9 | 931.0 |
| Solid Set Permanent | | 78 | 78 | 2.6 | 819.6 |
| Big Gun | | 47 | 47 | 3.1 | 1,791.5 |
| Gravity Systems | | 82,700 | 82,700 | 4.2 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 365 | 88,411 | 88,776 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 63 |
| Surface Water Lift (ft) | 15 |
| Combined Lift (ft) | 1 |
| Average Rate of Water Application (acft/ac) | 4.1 |
| Average On Farm Energy Consumption (kWh/ac) | 61.8 |
| Total On Farm Energy Consumption (MWh) | 5,487 |
| Energy Consumption for Diversion Pumping (MWh) | 2,863 |
| Total Energy Consumption (MWh) | 8,350 |
| Average Total Energy Consumption (kWh/ac) | 94.1 |

TABLE 5-2A: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 5 Subarea: Owyhee

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | 125 | 125 | 1.8 | 718.1 |
| Hand Move | | 2,826 | 2,826 | 2.8 | 869.0 |
| Side Roll | 365 | 2,635 | 3,000 | 2.9 | 931.0 |
| Solid Set | | 78 | 78 | 2.6 | 819.6 |
| Permanent | | | | | |
| Big Gun | | 47 | 47 | 3.1 | 1,791.5 |
| Gravity Systems | | 67,197 | 67,197 | 4.2 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 365 | 72,908 | 73,273 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 63 |
| Surface Water Lift (ft) | 15 |
| Average Rate of Water Application (acft/ac) | 4.1 |
| Average On Farm Energy Consumption (kWh/ac) | 73.0 |
| Total On Farm Energy Consumption (MWh) | 5,487 |
| Energy Consumption for Diversion Pumping (MWh) | 2,863 |
| Total Energy Consumption (MWh) | 8,350 |
| Average Total Energy Consumption (kWh/ac) | 114.0 |

TABLE 5-2B: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 5 Subarea: Owyhee

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | | | | | |
| Side Roll | | | | | |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | 15,503 | 15,503 | 4.2 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 0 | 15,503 | 15,503 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 0 |
| Surface Water Lift (ft) | 15 |
| Average Rate of Water Application (acft/ac) | 4.2 |
| Average On Farm Energy Consumption (kWh/ac) | 0.0 |
| Total On Farm Energy Consumption (MWh) | 0 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 0 |
| Average Total Energy Consumption (kWh/ac) | 0.0 |

TABLE 5-3: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 5 Subarea: Burnt, Powder

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 695 | 1,527 | 2,222 | 0.9 | 370.0 |
| Hand Move | 8,378 | 14,146 | 22,524 | 2.0 | 627.6 |
| Side Roll | 11,077 | 21,777 | 32,854 | 1.8 | 587.9 |
| Solid Set Permanent | | 533 | 533 | 1.1 | 354.7 |
| Big Gun | | 203 | 203 | 1.1 | 624.5 |
| Gravity Systems | | 86,109 | 86,109 | 3.4 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | 17 | 17 | 0.9 | 112.4 |
| TOTAL | 20,150 | 124,312 | 144,462 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 90 |
| Surface Water Lift (ft) | 6 |
| Combined Lift (ft) | 5 |
| Average Rate of Water Application (acft/ac) | 2.8 |
| Average On Farm Energy Consumption (kWh/ac) | 239.4 |
| Total On Farm Energy Consumption (MWh) | 34,591 |
| Energy Consumption for Diversion Pumping (MWh) | 11,325 |
| Total Energy Consumption (MWh) | 45,916 |
| Average Total Energy Consumption (kWh/ac) | 317.8 |

TABLE 5-4: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 5 Subarea: Weiser

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 3,940 | 1,789 | 5,729 | 3.2 | 1,081.4 |
| Side Roll | | 1,011 | 1,011 | 3.4 | 1,200.7 |
| Solid Set Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | 47,565 | 47,565 | 4.4 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 3,940 | 50,365 | 54,305 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 180 |
| Surface Water Lift (ft) | 20 |
| Combined Lift (ft) | 3 |
| Average Rate of Water Application (acft/ac) | 4.3 |
| Average On Farm Energy Consumption (kWh/ac) | 136.4 |
| Total On Farm Energy Consumption (MWh) | 7,409 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 7,409 |
| Average Total Energy Consumption (kWh/ac) | 136.4 |

TABLE 5-5: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 5 Subarea: Payette

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 11,276 | 10,010 | 21,286 | 3.0 | 1,179.7 |
| Side Roll | 5,575 | 4,949 | 10,524 | 3.0 | 1,205.8 |
| Solid Set | 818 | 728 | 1,546 | 3.3 | 1,356.8 |
| Permanent | 241 | 213 | 454 | 3.1 | 1,247.7 |
| Big Gun | | | | | |
| Gravity Systems | | 131,209 | 131,209 | 4.3 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 17,910 | 147,109 | 165,019 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 200 |
| Surface Water Lift (ft) | 45 |
| Combined Lift (ft) | 9 |
| Average Rate of Water Application (acft/ac) | 4.0 |
| Average On Farm Energy Consumption (kWh/ac) | 245.2 |
| Total On Farm Energy Consumption (MWh) | 40,466 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 40,466 |
| Average Total Energy Consumption (kWh/ac) | 245.2 |

TABLE 5-6: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho, Oregon Subregion: 5 Subarea: Boise

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 3,957 | 2,043 | 6,000 | 2.3 | 1,044.9 |
| Hand Move | 35,311 | 18,237 | 53,548 | 2.9 | 1,056.5 |
| Side Roll | 8,803 | 4,737 | 13,540 | 3.0 | 1,109.3 |
| Solid Set | 10,515 | 5,485 | 16,000 | 3.3 | 1,232.7 |
| Permanent | 104 | | 104 | 3.1 | 1,152.1 |
| Big Gun | | | | | |
| Gravity Systems | 5,000 | 364,090 | 369,090 | 4.1 | 40.2 |
| Return Recovery | | 5,000 | 5,000 | 2.6 | 70.6 |
| Drip/Trickle | | | | | |
| TOTAL | 63,690 | 399,592 | 463,282 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 350 |
| Surface Water Lift (ft) | 0 |
| Combined Lift (ft) | 11.0 |
| Average Rate of Water Application (acft/ac) | 3.9 |
| Average On Farm Energy Consumption (kWh/ac) | 243.7 |
| Total On Farm Energy Consumption (MWh) | 112,910 |
| Energy Consumption for Diversion Pumping (MWh) | 44,053 |
| Total Energy Consumption (MWh) | 156,963 |
| Average Total Energy Consumption (kWh/ac) | 338.8 |

TABLE 5-6A: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 5 Subarea: Boise

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 3,957 | 2,043 | 6,000 | 2.3 | 1,044.9 |
| Hand Move | 35,311 | 18,237 | 53,548 | 2.9 | 1,056.5 |
| Side Roll | 8,803 | 4,547 | 13,350 | 3.0 | 1,109.3 |
| Solid Set | 10,515 | 5,485 | 16,000 | 3.3 | 1,232.7 |
| Permanent | 104 | | 104 | 3.1 | 1,152.1 |
| Big Gun | | | | | |
| Gravity Systems | 5,000 | 359,011 | 364,011 | 4.1 | 40.8 |
| Return Recovery | | 5,000 | 5,000 | 2.6 | 70.6 |
| Drip/Trickle | | | | | |
| TOTAL | 63,690 | 394,323 | 458,013 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 350 |
| Surface Water Lift (ft) | 0 |
| Average Rate of Water Application (acft/ac) | 3.9 |
| Average On Farm Energy Consumption (kWh/ac) | 246.1 |
| Total On Farm Energy Consumption (MWh) | 112,700 |
| Energy Consumption for Diversion Pumping (MWh) | 41,928 |
| Total Energy Consumption (MWh) | 154,628 |
| Average Total Energy Consumption (kWh/ac) | 337.6 |

TABLE 5-6B: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 5 Subarea: Boise

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | | | | | |
| Side Roll | | 190 | 190 | 3.0 | 1,109.3 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | 5,079 | 5,079 | 4.1 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 0 | 5,269 | 5,269 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 0 |
| Surface Water Lift (ft) | 6 |
| Average Rate of Water Application (acft/ac) | 4.1 |
| Average On Farm Energy Consumption (kWh/ac) | 40.0 |
| Total On Farm Energy Consumption (MWh) | 211 |
| Energy Consumption for Diversion Pumping (MWh) | 2,125 |
| Total Energy Consumption (MWh) | 2,336 |
| Average Total Energy Consumption (kWh/ac) | 443.3 |

TABLE 5-7: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho, Oregon Subregion: 5 Subarea: Bruneau

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 6,378 | | 6,378 | 2.5 | 1,142.2 |
| Hand Move | 18,220 | 36,681 | 54,901 | 3.2 | 1,158.5 |
| Side Roll | 3,324 | 7,073 | 10,397 | 3.4 | 1,277.6 |
| Solid Set | 3,201 | 6,365 | 9,566 | 3.2 | 1,218.3 |
| Permanent Big Gun Gravity Systems Return Recovery Drip/Trickle | | 147,882 | 147,882 | 4.5 | 0.0 |
| TOTAL | 31,123 | 198,001 | 229,124 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 284 |
| Surface Water Lift (ft) | 8 |
| Combined Lift (ft) | 13 |
| Average Rate of Water Application (acft/ac) | 4.0 |
| Average On Farm Energy Consumption (kWh/ac) | 418.2 |
| Total On Farm Energy Consumption (MWh) | 95,825 |
| Energy Consumption for Diversion Pumping (MWh) | 71,728 |
| Total Energy Consumption (MWh) | 167,553 |
| Average Total Energy Consumption (kWh/ac) | 731.3 |

TABLE 5-7A: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 5 Subarea: Bruneau

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 6,378 | | 6,378 | 2.5 | 1,142.2 |
| Hand Move | 18,220 | 35,989 | 54,209 | 3.2 | 1,158.5 |
| Side Roll | 3,201 | 6,381 | 9,582 | 3.4 | 1,277.6 |
| Solid Set | 3,201 | 6,365 | 9,566 | 3.2 | 1,218.3 |
| Permanent Big Gun Gravity Systems Return Recovery Drip/Trickle | | 130,153 | 130,153 | 4.5 | 0.0 |
| TOTAL | 31,000 | 178,888 | 209,888 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 285 |
| Surface Water Lift (ft) | 8 |
| Average Rate of Water Application (acft/ac) | 4.0 |
| Average On Farm Energy Consumption (kWh/ac) | 447.8 |
| Total On Farm Energy Consumption (MWh) | 93,982 |
| Energy Consumption for Diversion Pumping (MWh) | 64,021 |
| Total Energy Consumption (MWh) | 158,003 |
| Average Total Energy Consumption (kWh/ac) | 752.8 |

TABLE 5-7B: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 5 Subarea: Bruneau

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | | 692 | 692 | 3.2 | 1,158.5 |
| Side Roll | 123 | 692 | 815 | 3.4 | 1,277.6 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | 17,729 | 17,729 | 4.5 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 123 | 19,113 | 19,236 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 63 |
| Surface Water Lift (ft) | 6 |
| Average Rate of Water Application (acft/ac) | 4.4 |
| Average On Farm Energy Consumption (kWh/ac) | 95.8 |
| Total On Farm Energy Consumption (MWh) | 1,843 |
| Energy Consumption for Diversion Pumping (MWh) | 7,707 |
| Total Energy Consumption (MWh) | 9,550 |
| Average Total Energy Consumption (kWh/ac) | 496.5 |

TABLE 6: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho, Oregon, Washington Subregion: 6 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 430 | 15,227 | 15,657 | 2.2 | 1,069.8 |
| Hand Move | 4,962 | 22,796 | 27,758 | 2.5 | 901.3 |
| Side Roll | 10,208 | 56,614 | 66,822 | 2.3 | 835.9 |
| Solid Set | | 2,220 | 2,220 | 3.7 | 1,484.0 |
| Permanent | .. | 2,000 | 2,000 | 4.3 | 1,801.9 |
| Big Gun | | 1,297 | 1,297 | 3.3 | 2,188.6 |
| Gravity Systems Return Recovery | 100 | 151,393 | 151,493 | 3.3 | 1.0 |
| Drip/Trickle | | 23 | 23 | 2.1 | 269.3 |
| TOTAL | 15,700 | 251,570 | 267,270 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 129 |
| Surface Water Lift (ft) | 27 |
| Combined Lift (ft) | 16 |
| Average Rate of Water Application (acft/ac) | 2.9 |
| Average On Farm Energy Consumption (kWh/ac) | 402.3 |
| Total On Farm Energy Consumption (MWh) | 107,523 |
| Energy Consumption for Diversion Pumping (MWh) | 30,651 |
| Total Energy Consumption (MWh) | 138,174 |
| Average Total Energy Consumption (kWh/ac) | 517.0 |

*Subregion 6 includes subareas Clearwater; Salmon; Upper Salmon; Palouse, Lower Snake; Grande Ronde.

TABLE 6A: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 6 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 660 | 11,845 | 12,505 | 2.6 | 909.0 |
| Side Roll | 340 | 60 | 400 | 2.3 | 785.4 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | 126,225 | 126,225 | 3.1 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 1,000 | 138,130 | 139,130 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 90 |
| Surface Water Lift (ft) | 29 |
| Average Rate of Water Application (acft/ac) | 3.1 |
| Average On Farm Energy Consumption (kWh/ac) | 84.0 |
| Total On Farm Energy Consumption (MWh) | 11,681 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 11,681 |
| Average Total Energy Consumption (kWh/ac) | 84.0 |

*Subregion 6, Idaho, includes subareas Clearwater, Salmon, Upper Salmon, and the Idaho portion of Palouse, Lower Snake.

TABLE 6B: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 6 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 430 | 227 | 657 | 1.5 | 624.3 |
| Hand Move | 2,452 | 7,551 | 10,003 | 1.9 | 596.0 |
| Side Roll | 2,868 | 43,734 | 46,602 | 2.2 | 730.9 |
| Solid Set | | 215 | 215 | 5.5 | 1,814.4 |
| Permanent | | | | | |
| Big Gun | | 297 | 297 | 1.7 | 1,010.7 |
| Gravity Systems | | 25,168 | 25,168 | 4.1 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | 23 | 23 | 2.1 | 269.3 |
| TOTAL | 5,750 | 77,215 | 82,965 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 26 |
| Surface Water Lift (ft) | 20 |
| Average Rate of Water Application (acft/ac) | 2.7 |
| Average On Farm Energy Consumption (kWh/ac) | 495.7 |
| Total On Farm Energy Consumption (MWh) | 41,130 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 41,130 |
| Average Total Energy Consumption (kWh/ac) | 495.7 |

*Subregion 6, Oregon, includes the Oregon portion of Grande Ronde.

TABLE 6C: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 6 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | 15,000 | 15,000 | 2.2 | 1,089.3 |
| Hand Move | 1,850 | 3,400 | 5,250 | 3.7 | 1,464.8 |
| Side Roll | 7,000 | 12,820 | 19,820 | 2.6 | 1,083.9 |
| Solid Set | | 2,005 | 2,005 | 3.5 | 1,448.5 |
| Permanent | | 2,000 | 2,000 | 4.3 | 1,801.9 |
| Big Gun | | 1,000 | 1,000 | 3.8 | 2,538.4 |
| Gravity Systems | 100 | | 100 | 4.1 | 1,527.5 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 8,950 | 36,225 | 45,175 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 300 |
| Surface Water Lift (ft) | 35 |
| Average Rate of Water Application (acft/ac) | 2.7 |
| Average On Farm Energy Consumption (kWh/ac) | 1,211.1 |
| Total On Farm Energy Consumption (MWh) | 54,712 |
| Energy Consumption for Diversion Pumping (MWh) | 30,651 |
| Total Energy Consumption (MWh) | 85,363 |
| Average Total Energy Consumption (kWh/ac) | 1,889.6 |

*Subregion 6, Washington, includes the Washington portions of Grande Ronde and Palouse, Lower Snake.

TABLE 6-1: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 6 Subarea: Clearwater

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | | 1,892 | 1,892 | 2.7 | 935.8 |
| Side Roll | | | | | |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 0 | 1,892 | 1,892 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 0 |
| Surface Water Lift (ft) | 35 |
| Combined Lift (ft) | 35 |
| Average Rate of Water Application (acft/ac) | 2.7 |
| Average On Farm Energy Consumption (kWh/ac) | 935.8 |
| Total On Farm Energy Consumption (MWh) | 1,771 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 1,771 |
| Average Total Energy Consumption (kWh/ac) | 935.8 |

TABLE 6-2: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 6 Subarea: Salmon

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 160 | 3,853 | 4,013 | 3.1 | 1,195.5 |
| Side Roll | | | | | |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | 12,685 | 12,685 | 4.1 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 160 | 16,538 | 16,698 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 50 |
| Surface Water Lift (ft) | 53 |
| Combined Lift (ft) | 10 |
| Average Rate of Water Application (acft/ac) | 3.9 |
| Average On Farm Energy Consumption (kWh/ac) | 287.3 |
| Total On Farm Energy Consumption (MWh) | 4,797 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 4,797 |
| Average Total Energy Consumption (kWh/ac) | 287.3 |

TABLE 6-3: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 6 Subarea: Upper Salmon

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 500 | 6,100 | 6,600 | 2.2 | 727.1 |
| Side Roll | 340 | 60 | 400 | 2.3 | 785.4 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | 113,540 | 113,540 | 3.0 | 0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 840 | 119,700 | 120,540 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 100 |
| Surface Water Lift (ft) | 25 |
| Combined Lift (ft) | 1 |
| Average Rate of Water Application (acft/ac) | 2.9 |
| Average On Farm Energy Consumption (kWh/ac) | 42.4 |
| Total On Farm Energy Consumption (MWh) | 5,113 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 5,113 |
| Average Total Energy Consumption (kWh/ac) | 42.4 |

TABLE 6-4: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington, Idaho Subregion: 6 Subarea: Palouse, Lower Snake

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | 15,000 | 15,000 | 2.2 | 1,089.3 |
| Hand Move | 1,850 | 3,000 | 4,850 | 3.8 | 1,536.4 |
| Side Roll | 7,000 | 12,720 | 19,720 | 2.6 | 1,085.7 |
| Solid Set | | 2,005 | 2,005 | 3.5 | 1,448.5 |
| Permanent | | 2,000 | 2,000 | 4.3 | 1,801.9 |
| Big Gun | | 1,000 | 1,000 | 3.8 | 2,538.4 |
| Gravity Systems | 100 | | 100 | 4.1 | 1,527.5 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 8,950 | 35,725 | 44,675 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 200 |
| Surface Water Lift (ft) | 35 |
| Combined Lift (ft) | 68 |
| Average Rate of Water Application (acft/ac) | 2.8 |
| Average On Farm Energy Consumption (kWh/ac) | 1,217.7 |
| Total On Farm Energy Consumption (MWh) | 54,400 |
| Energy Consumption for Diversion Pumping (MWh) | 30,651 |
| Total Energy Consumption (MWh) | 85,051 |
| Average Total Energy Consumption (kWh/ac) | 1,903.8 |

TABLE 6-4A: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 6 Subarea: Palouse, Lower Snake

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | 15,000 | 15,000 | 2.2 | 1,089.3 |
| Hand Move | 1,850 | 3,000 | 4,850 | 3.8 | 1,536.4 |
| Side Roll | 7,000 | 12,720 | 19,720 | 2.6 | 1,085.7 |
| Solid Set | | 2,005 | 2,005 | 3.5 | 1,448.5 |
| Permanent | | 2,000 | 2,000 | 4.3 | 1,801.9 |
| Big Gun | | 1,000 | 1,000 | 3.8 | 2,538.4 |
| Gravity Systems | 100 | | 100 | 4.1 | 1,527.5 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 8,950 | 35,725 | 44,675 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 200 |
| Surface Water Lift (ft) | 35 |
| Average Rate of Water Application (acft/ac) | 2.8 |
| Average On Farm Energy Consumption (kWh/ac) | 1,217.7 |
| Total On Farm Energy Consumption (MWh) | 54,400 |
| Energy Consumption for Diversion Pumping (MWh) | 30,651 |
| Total Energy Consumption (MWh) | 85,051 |
| Average Total Energy Consumption (kWh/ac) | 1,903.8 |

TABLE 6-4B: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 6 Subarea: Palouse. Lower Snake

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | | | | | |
| Side Roll | | | | | |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 0 | 0 | 0 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 0 |
| Surface Water Lift (ft) | 0 |
| Average Rate of Water Application (acft/ac) | 0 |
| Average On Farm Energy Consumption (kWh/ac) | 0 |
| Total On Farm Energy Consumption (MWh) | 0 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 0 |
| Average Total Energy Consumption (kWh/ac) | 0 |

TABLE 6-5: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon, Washington Subregion: 6 Subarea: Grande Ronde

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 430 | 227 | 657 | 1.5 | 624.3 |
| Hand Move | 2,452 | 7,951 | 10,403 | 1.9 | 596.0 |
| Side Roll | 2,868 | 43,834 | 46,702 | 2.2 | 730.9 |
| Solid Set | | 215 | 215 | 5.5 | 1,814.4 |
| Permanent | | | | | |
| Big Gun | | 297 | 297 | 1.7 | 1,010.7 |
| Gravity Systems | | 25,168 | 25,168 | 4.1 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | 23 | 23 | 2.1 | 269.3 |
| TOTAL | 5,750 | 77,715 | 83,465 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 26 |
| Surface Water Lift (ft) | 20 |
| Combined Lift (ft) | 11 |
| Average Rate of Water Application (acft/ac) | 2.7 |
| Average On Farm Energy Consumption (kWh/ac) | 496.5 |
| Total On Farm Energy Consumption (MWh) | 41,442 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 41,442 |
| Average Total Energy Consumption (kWh/ac) | 496.5 |

TABLE 6-5A: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 6 Subarea: Grande Ronde

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 430 | 227 | 657 | 1.5 | 624.3 |
| Hand Move | 2,452 | 7,551 | 10,003 | 1.9 | 596.0 |
| Side Roll | 2,868 | 43,734 | 46,602 | 2.2 | 730.9 |
| Solid Set | | 215 | 215 | 5.5 | 1,814.4 |
| Permanent | | | | | |
| Big Gun | | 297 | 297 | 1.7 | 1,010.7 |
| Gravity Systems | | 25,168 | 25,168 | 4.1 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | 23 | 23 | 2.1 | 269.3 |
| TOTAL | 5,750 | 77,215 | 82,965 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 26 |
| Surface Water Lift (ft) | 20 |
| Average Rate of Water Application (acft/ac) | 2.7 |
| Average On Farm Energy Consumption (kWh/ac) | 495.7 |
| Total On Farm Energy Consumption (MWh) | 41,130 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 41,130 |
| Average Total Energy Consumption (kWh/ac) | 495.7 |

TABLE 6-5B: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 6 Subarea: Grande Ronde

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | | 400 | 400 | 1.9 | 596.0 |
| Side Roll | | 100 | 100 | 2.2 | 730.9 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 0 | 500 | 500 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 0 |
| Surface Water Lift (ft) | 25 |
| Average Rate of Water Application (acft/ac) | 2.0 |
| Average On Farm Energy Consumption (kWh/ac) | 623.0 |
| Total On Farm Energy Consumption (MWh) | 311 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 311 |
| Average Total Energy Consumption (kWh/ac) | 623.0 |

TABLE 7: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon, Washington Subregion: 7 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 11,974 | 123,665 | 135,639 | 2.5 | 1,946.2 |
| Hand Move | 10,709 | 89,664 | 100,373 | 3.0 | 1,264.1 |
| Side Roll | 25,123 | 169,872 | 194,995 | 3.1 | 1,691.1 |
| Solid Set | 1,117 | 4,225 | 5,342 | 3.3 | 1,967.0 |
| Permanent | 150 | 2,378 | 2,528 | 2.4 | 1,063.9 |
| Big Gun | 170 | 1,092 | 1,262 | 2.2 | 1,411.5 |
| Gravity Systems | | 121,629 | 121,629 | 4.5 | 0.0 |
| Return Recovery | | 13,560 | 13,560 | 2.2 | 61.0 |
| Drip/Trickle | | 246 | 246 | 3.8 | 2,232.8 |
| TOTAL | 49,243 | 526,331 | 575,574 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 130 |
| Surface Water Lift (ft) | 118 |
| Combined Lift (ft) | 104 |
| Average Rate of Water Application (acft/ac) | 3.2 |
| Average On Farm Energy Consumption (kWh/ac) | 1,280.4 |
| Total On Farm Energy Consumption (MWh) | 736,982 |
| Energy Consumption for Diversion Pumping (MWh) | 21,710 |
| Total Energy Consumption (MWh) | 758,692 |
| Average Total Energy Consumption (kWh/ac) | 1,318.1 |

*Subregion 7 includes subareas Northside Columbia, Walla-Walla, Hood, Deschutes, John Day, Umatilla.

TABLE 7A: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 7 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 11,734 | 73,365 | 85,099 | 2.5 | 1,839.1 |
| Hand Move | 6,699 | 78,994 | 85,693 | 2.8 | 1,070.1 |
| Side Roll | 18,995 | 126,578 | 145,573 | 2.9 | 1,490.7 |
| Solid Set | 1,117 | 4,225 | 5,342 | 3.3 | 1,967.0 |
| Permanent | | 2,378 | 2,378 | 2.2 | 838.5 |
| Big Gun | 170 | 1,092 | 1,262 | 2.3 | 1,411.5 |
| Gravity Systems | | 117,249 | 117,249 | 4.0 | 0.0 |
| Return Recovery | | 13,560 | 13,560 | 2.2 | 61.0 |
| Drip/Trickle | | 46 | 46 | 1.7 | 289.6 |
| TOTAL | 38,715 | 417,487 | 456,202 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 126 |
| Surface Water Lift (ft) | 100 |
| Average Rate of Water Application (acft/ac) | 3.1 |
| Average On Farm Energy Consumption (kWh/ac) | 1,052.9 |
| Total On Farm Energy Consumption (MWh) | 480,336 |
| Energy Consumption for Diversion Pumping (MWh) | 21,829 |
| Total Energy Consumption (MWh) | 502,165 |
| Average Total Energy Consumption (kWh/ac) | 1,100.8 |

* Subregion 7, Oregon, includes the Oregon portion of subarea Walla-Walla and subareas Hood, Deschutes, John Day, Umatilla.

TABLE 7B: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 7 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 240 | 50,300 | 50,540 | 2.4 | 2,126.5 |
| Hand Move | 4,010 | 10,670 | 14,680 | 4.3 | 2,396.9 |
| Side Roll | 7,100 | 42,322 | 49,422 | 3.8 | 2,281.6 |
| Solid Set | | | | | |
| Permanent | 150 | | 150 | 5.6 | 4,637.0 |
| Big Gun | | | | | |
| Gravity Systems | | 4,380 | 4,380 | 5.3 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | 200 | 200 | 4.3 | 2,679.8 |
| TOTAL | 11,500 | 107,872 | 119,372 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 159 |
| Surface Water Lift (ft) | 201 |
| Average Rate of Water Application (acft/ac) | 3.3 |
| Average On Farm Energy Consumption (kWh/ac) | 2,150.0 |
| Total On Farm Energy Consumption (MWh) | 256,552 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 256,552 |
| Average Total Energy Consumption (kWh/ac) | 2,150.0 |

*Subregion 7, Washington, includes subarea Northside Columbia and the Washington portion of subarea Walla-Walla.

TABLE 7-1: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 7 Subarea: Northside Columbia

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 240 | 50,000 | 50,240 | 2.4 | 2,133.0 |
| Hand Move | 1,510 | 4,490 | 6,000 | 4.5 | 3,641.0 |
| Side Roll | 2,100 | 20,310 | 22,410 | 4.2 | 3,476.6 |
| Solid Set | | | | | |
| Permanent | 150 | | 150 | 5.6 | 4,637.0 |
| Big Gun | | | | | |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | | 200 | 200 | 4.3 | 2,679.8 |
| TOTAL | 4,000 | 75,000 | 79,000 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 200 |
| Surface Water Lift (ft) | 295 |
| Combined Lift (ft) | 290 |
| Average Rate of Water Application (acft/ac) | 3.1 |
| Average On Farm Energy Consumption (kWh/ac) | 2,634.8 |
| Total On Farm Energy Consumption (MWh) | 208,149 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 208,149 |
| Average Total Energy Consumption (kWh/ac) | 2,634.8 |

TABLE 7-2: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington, Oregon Subregion: 7 Subarea: Walla-Walla

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 1,195 | 8,044 | 9,339 | 2.3 | 1,031.5 |
| Hand Move | 2,678 | 8,240 | 10,918 | 4.2 | 1,537.0 |
| Side Roll | 6,235 | 36,113 | 42,340 | 3.4 | 1,290.2 |
| Solid Set | 52 | 327 | 379 | 3.8 | 1,442.4 |
| Permanent | | 12 | 12 | 3.1 | 1,163.7 |
| Big Gun | | | | | |
| Gravity Systems | | 7,574 | 7,574 | 5.3 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 10,160 | 60,302 | 70,462 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 140 |
| Surface Water Lift (ft) | 30 |
| Combined Lift (ft) | 39 |
| Average Rate of Water Application (acft/ac) | 3.6 |
| Average On Farm Energy Consumption (kWh/ac) | 1,156.6 |
| Total On Farm Energy Consumption (MWh) | 81,498 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 81,498 |
| Average Total Energy Consumption (kWh/ac) | 1,156.6 |

TABLE 7-2A: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 7 Subarea: Walla-Walla

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | 300 | 300 | 2.3 | 1,031.5 |
| Hand Move | 2,500 | 6,180 | 8,680 | 4.2 | 1,537.0 |
| Side Roll | 5,000 | 22,012 | 27,012 | 3.4 | 1,290.2 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | 4,380 | 4,380 | 5.3 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 7,500 | 32,872 | 40,372 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 140 |
| Surface Water Lift (ft) | 30 |
| Average Rate of Water Application (acft/ac) | 3.8 |
| Average On Farm Energy Consumption (kWh/ac) | 1,201.4 |
| Total On Farm Energy Consumption (MWh) | 48,501 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 48,501 |
| Average Total Energy Consumption (kWh/ac) | 1,201.4 |

TABLE 7-2B: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 7 Subarea: Walla-Walla

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 1,195 | 7,744 | 8,939 | 2.3 | 1,031.5 |
| Hand Move | 178 | 2,060 | 2,238 | 4.2 | 1,537.0 |
| Side Roll | 1,235 | 14,093 | 15,328 | 3.4 | 1,290.2 |
| Solid Set | 52 | 327 | 379 | 3.8 | 1,442.4 |
| Permanent | | 12 | 12 | 3.1 | 1,163.7 |
| Big Gun | | | | | |
| Gravity Systems | | 3,194 | 3,194 | 5.3 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 2,660 | 27,430 | 30,090 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 140 |
| Surface Water Lift (ft) | 30 |
| Average Rate of Water Application (acft/ac) | 3.3 |
| Average On Farm Energy Consumption (kWh/ac) | 1,096.6 |
| Total On Farm Energy Consumption (MWh) | 32,997 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 32,997 |
| Average Total Energy Consumption (kWh/ac) | 1,096.6 |

TABLE 7-3: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 7 Subarea: Hood

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 125 | 125 | 250 | 1.6 | 737.0 |
| Hand Move | 1,631 | 19,970 | 21,601 | 2.3 | 846.4 |
| Side Roll | 160 | 905 | 1,065 | 2.5 | 922.9 |
| Solid Set | | 419 | 419 | 2.2 | 817.3 |
| Permanent | | 2,334 | 2,334 | 2.2 | 817.3 |
| Big Gun | | 162 | 162 | 1.2 | 726.5 |
| Gravity Systems | | 908 | 908 | 4.3 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | 46 | 46 | 1.7 | 289.6 |
| TOTAL | 1,916 | 24,869 | 26,785 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 168 |
| Surface Water Lift (ft) | 36 |
| Combined Lift (ft) | 43 |
| Average Rate of Water Application (acft/ac) | 2.4 |
| Average On Farm Energy Consumption (kWh/ac) | 815.1 |
| Total On Farm Energy Consumption (MWh) | 21,831 |
| Energy Consumption for Diversion Pumping (MWh) | 15,721 |
| Total Energy Consumption (MWh) | 37,552 |
| Average Total Energy Consumption (kWh/ac) | 1,402.0 |

TABLE 7-4: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 7 Subarea: Deschutes

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 425 | 1,661 | 2,086 | 2.1 | 846.4 |
| Hand Move | 2,485 | 45,289 | 47,774 | 2.8 | 913.1 |
| Side Roll | 3,480 | 54,151 | 57,631 | 2.4 | 793.9 |
| Solid Set | | 1,185 | 1,185 | 2.0 | 677.4 |
| Permanent | | | | | |
| Big Gun | 100 | 543 | 643 | 2.3 | 1,340.2 |
| Gravity Systems | | 63,154 | 63,154 | 3.3 | 0.0 |
| Return Recovery | | 13,560 | 13,560 | 2.2 | 61.0 |
| Drip/Trickle | | | | | |
| TOTAL | 6,490 | 179,543 | 186,033 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 187 |
| Surface Water Lift (ft) | 17 |
| Combined Lift (ft) | 17 |
| Average Rate of Water Application (acft/ac) | 2.8 |
| Average On Farm Energy Consumption (kWh/ac) | 503.3 |
| Total On Farm Energy Consumption (MWh) | 93,630 |
| Energy Consumption for Diversion Pumping (MWh) | 1,637 |
| Total Energy Consumption (MWh) | 95,267 |
| Average Total Energy Consumption (kWh/ac) | 512.1 |

TABLE 7-5: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 7 Subarea: John Day

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 821 | 1,389 | 2,210 | 1.8 | 724.1 |
| Hand Move | 1,251 | 4,897 | 6,148 | 2.6 | 828.6 |
| Side Roll | 2,816 | 11,108 | 13,924 | 2.6 | 868.0 |
| Solid Set | 12 | 68 | 80 | 2.7 | 902.5 |
| Permanent | | | | | |
| Big Gun | 70 | 283 | 353 | 2.5 | 1,481.8 |
| Gravity Systems | | 33,776 | 33,776 | 4.0 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 4,970 | 51,521 | 56,491 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 47 |
| Surface Water Lift (ft) | 20 |
| Combined Lift (ft) | 7 |
| Average Rate of Water Application (acft/ac) | 3.4 |
| Average On Farm Energy Consumption (kWh/ac) | 343.0 |
| Total On Farm Energy Consumption (MWh) | 19,376 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 19,376 |
| Average Total Energy Consumption (kWh/ac) | 343.0 |

TABLE 7-6: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 7 Subarea: Umatilla

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 9,168 | 62,446 | 71,614 | 2.6 | 2,007.1 |
| Hand Move | 1,154 | 6,778 | 7,932 | 3.8 | 2,680.0 |
| Side Roll | 11,304 | 46,321 | 57,625 | 3.4 | 2,401.9 |
| Solid Set | 1,053 | 2,226 | 3,279 | 3.8 | 2,666.6 |
| Permanent | | 32 | 32 | 3.2 | 2,259.5 |
| Big Gun | | 104 | 104 | 2.8 | 2,680.8 |
| Gravity Systems | | 16,217 | 16,217 | 6.1 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 22,679 | 134,124 | 156,803 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 115 |
| Surface Water Lift (ft) | 245 |
| Combined Lift (ft) | 184 |
| Average Rate of Water Application (acft/ac) | 3.3 |
| Average On Farm Energy Consumption (kWh/ac) | 1,992.9 |
| Total On Farm Energy Consumption (MWh) | 312,498 |
| Energy Consumption for Diversion Pumping (MWh) | 4,471 |
| Total Energy Consumption (MWh) | 316,969 |
| Average Total Energy Consumption (kWh/ac) | 2,021.4 |

TABLE 8: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington, Oregon Subregion: 8 Subarea: Lower Columbia*

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 5,707 | 5,915 | 11,622 | 2.1 | 817.9 |
| Side Roll | 500 | 460 | 960 | 1.3 | 524.5 |
| Solid Set | 8 | | 8 | 1.7 | 678.9 |
| Permanent | | | | | |
| Big Gun | 100 | 147 | 247 | 2.4 | 1,552.3 |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | 102 | 100 | 202 | 1.5 | 273.5 |
| TOTAL | 6,417 | 6,622 | 13,039 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 75 |
| Surface Water Lift (ft) | 32 |
| Combined Lift (ft) | 53 |
| Average Rate of Water Application (acft/ac) | 2.1 |
| Average On Farm Energy Consumption (kWh/ac) | 801.7 |
| Total On Farm Energy Consumption (MWh) | 10,453 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 10,453 |
| Average Total Energy Consumption (kWh/ac) | 801.7 |

*Subregion 8 includes only one subarea--Lower Columbia.

TABLE 8A: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 8 Subarea: Lower Columbia*

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 5,490 | 5,000 | 10,490 | 2.1 | 817.9 |
| Side Roll | 500 | 460 | 960 | 1.3 | 524.5 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | 100 | 100 | 200 | 2.4 | 1,552.3 |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | 100 | 100 | 200 | 1.5 | 273.2 |
| TOTAL | 6,190 | 5,660 | 11,850 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 75 |
| Surface Water Lift (ft) | 35 |
| Average Rate of Water Application (acft/ac) | 2.0 |
| Average On Farm Energy Consumption (kWh/ac) | 797.3 |
| Total On Farm Energy Consumption (MWh) | 9,448 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 9,448 |
| Average Total Energy Consumption (kWh/ac) | 797.3 |

*Subregion 8, Washington, includes the Washington portion of subarea Lower Columbia.

TABLE 8B: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 8 Subarea: Lower Columbia*

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 217 | 915 | 1,132 | 2.1 | 817.9 |
| Side Roll | | | | | |
| Solid Set | 8 | | 8 | 1.7 | 524.5 |
| Permanent | | | | | |
| Big Gun | | 47 | 47 | 2.4 | 1,552.3 |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | 2 | | 2 | 1.5 | 273.5 |
| TOTAL | 227 | 962 | 1,189 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 72 |
| Surface Water Lift (ft) | 13 |
| Average Rate of Water Application (acft/ac) | 2.1 |
| Average On Farm Energy Consumption (kWh/ac) | 844.0 |
| Total On Farm Energy Consumption (MWh) | 1,004 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 1,004 |
| Average Total Energy Consumption (kWh/ac) | 844.0 |

*Subregion 8, Oregon, includes the Oregon portion of subarea Lower Columbia.

TABLE 9: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 9 Subarea: Willamette*

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 87,468 | 105,895 | 193,363 | 1.6 | 581.1 |
| Side Roll | 17,114 | 20,462 | 37,576 | 1.5 | 546.9 |
| Solid Set | 1,205 | 1,474 | 2,679 | 2.1 | 780.3 |
| Permanent | 2,564 | 3,134 | 5,698 | 2.9 | 1,067.2 |
| Big Gun | 9,524 | 11,640 | 21,164 | 1.3 | 847.0 |
| Gravity Systems | | 1,466 | 1,466 | 2.4 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | 53 | 64 | 117 | 1.3 | 217.8 |
| TOTAL | 117,928 | 144,135 | 262,063 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 72 |
| Surface Water Lift (ft) | 20 |
| Combined Lift (ft) | 43 |
| Average Rate of Water Application (acft/ac) | 1.6 |
| Average On Farm Energy Consumption (kWh/ac) | 606.8 |
| Total On Farm Energy Consumption (MWh) | 159,032 |
| Energy Consumption for Diversion Pumping (MWh) | 513 |
| Total Energy Consumption (MWh) | 159,545 |
| Average Total Energy Consumption (kWh/ac) | 608.8 |

*Subregion 9 includes only one subarea--Willamette.

TABLE 10: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon, Washington Subregion: 10 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 755 | 59,210 | 56,965 | 2.1 | 724.0 |
| Side Roll | | | 10,495 | 2.5 | 817.6 |
| Solid Set | | 1,211 | 1,211 | 1.8 | 615.8 |
| Permanent | 40 | 3,163 | 3,203 | 2.1 | 757.6 |
| Big Gun | 593 | 5,086 | 5,679 | 2.2 | 1,329.2 |
| Gravity Systems | 20 | 36,832 | 36,852 | 4.1 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | 67 | 67 | 2.0 | 262.1 |
| TOTAL | 1,415 | 113,057 | 114,472 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 20 |
| Surface Water Lift (ft) | 33 |
| Combined Lift (ft) | 15 |
| Average Rate of Water Application (acft/ac) | 2.8 |
| Average On Farm Energy Consumption (kWh/ac) | 529.1 |
| Total On Farm Energy Consumption (MWh) | 60,562 |
| Energy Consumption for Diversion Pumping (MWh) | 1,236 |
| Total Energy Consumption (MWh) | 61,799 |
| Average Total Energy Consumption (kWh/ac) | 539.9 |

*Subregion 10 includes subareas Washington Coast, Oregon Coast, Umpqua, and Rogue.

TABLE 10A: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 10 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 755 | 52,420 | 53,175 | 2.2 | 742.0 |
| Side Roll | | 10,495 | 10,495 | 2.5 | 817.6 |
| Solid Set | | 281 | 281 | 1.8 | 573.3 |
| Permanent | 40 | 3,163 | 3,203 | 2.2 | 757.6 |
| Big Gun | 593 | 5,086 | 5,679 | 2.2 | 1,329.2 |
| Gravity Systems | 20 | 36,832 | 36,852 | 4.1 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | 7 | 60 | 67 | 2.0 | 262.1 |
| TOTAL | 1,415 | 108,337 | 109,752 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 20 |
| Surface Water Lift (ft) | 34 |
| Average Rate of Water Application (acft/ac) | 2.9 |
| Average On Farm Energy Consumption (kWh/ac) | 530.2 |
| Total On Farm Energy Consumption (MWh) | 58,191 |
| Energy Consumption for Diversion Pumping (MWh) | 1,236 |
| Total Energy Consumption (MWh) | 59,427 |
| Average Total Energy Consumption (kWh/ac) | 541.5 |

*Subregion 10, Oregon, includes subareas Oregon Coast, Umpqua, and Roque.

TABLE 10B: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 10 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | | 3,790 | 3,790 | 1.4 | 471.3 |
| Side Roll | | | | | |
| Solid Set | | 930 | 930 | 1.9 | 628.6 |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 0 | 4,720 | 4,720 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 0 |
| Surface Water Lift (ft) | 25 |
| Average Rate of Water Application (acft/ac) | 1.5 |
| Average On Farm Energy Consumption (kWh/ac) | 502.3 |
| Total On Farm Energy Consumption (MWh) | 2,371 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 2,371 |
| Average Total Energy Consumption (kWh/ac) | 502.3 |

*Subregion 10, Washington, includes subarea Washington Coast.

TABLE 10-1: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 10 Subarea: Washington Coast

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | | 3,790 | 3,790 | 1.4 | 471.3 |
| Side Roll | | | | | |
| Solid Set | | 930 | 930 | 1.9 | 628.6 |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 0 | 4,720 | 4,720 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 0 |
| Surface Water Lift (ft) | 25 |
| Combined Lift (ft) | 25 |
| Average Rate of Water Application (acft/ac) | 1.5 |
| Average On Farm Energy Consumption (kWh/ac) | 502.3 |
| Total On Farm Energy Consumption (MWh) | 2,371 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 2,371 |
| Average Total Energy Consumption (kWh/ac) | 502.3 |

TABLE 10-2: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 10 Subarea: Oregon Coast

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 700 | 24,070 | 24,770 | 1.8 | 583.9 |
| Side Roll | | | | | |
| Solid Set | | 281 | 281 | 1.8 | 573.3 |
| Permanent | | 683 | 683 | 2.0 | 644.5 |
| Big Gun | | 1,019 | 1,019 | 1.8 | 1,058.6 |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | | 10 | 10 | 1.8 | 219.6 |
| TOTAL | 700 | 26,063 | 26,763 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 30 |
| Surface Water Lift (ft) | 18 |
| Combined Lift (ft) | 18 |
| Average Rate of Water Application (acft/ac) | 1.8 |
| Average On Farm Energy Consumption (kWh/ac) | 603.3 |
| Total On Farm Energy Consumption (MWh) | 16,145 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 16,145 |
| Average Total Energy Consumption (kWh/ac) | 603.3 |

TABLE 10-3: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 10 Subarea: Umpqua

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 55 | 4,751 | 4,806 | 2.2 | 694.8 |
| Side Roll | | 10,495 | 10,495 | 2.5 | 817.6 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | 3,210 | 3,210 | 2.5 | 1,480.0 |
| Gravity Systems | 20 | 330 | 350 | 4.2 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | 50 | 50 | 2.1 | 265.5 |
| TOTAL | 75 | 18,836 | 18,911 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 13 |
| Surface Water Lift (ft) | 20 |
| Combined Lift (ft) | 19 |
| Average Rate of Water Application (acft/ac) | 2.4 |
| Average On Farm Energy Consumption (kWh/ac) | 882.2 |
| Total On Farm Energy Consumption (MWh) | 16,684 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 16,684 |
| Average Total Energy Consumption (kWh/ac) | 882.2 |

TABLE 10-4: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 10 Subarea: Rogue

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | | 23,599 | 23,599 | 2.6 | 917.6 |
| Side Roll | | | | | |
| Solid Set | | | | | |
| Permanent | 40 | 2,480 | 2,520 | 2.2 | 788.3 |
| Big Gun | 593 | 857 | 1,450 | 1.9 | 1,185.5 |
| Gravity Systems | | 36,502 | 36,502 | 4.1 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | 7 | | 7 | 1.8 | 298.1 |
| TOTAL | 640 | 63,438 | 64,078 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 14 |
| Surface Water Lift (ft) | 40 |
| Combined Lift (ft) | 13 |
| Average Rate of Water Application (acft/ac) | 3.4 |
| Average On Farm Energy Consumption (kWh/ac) | 395.8 |
| Total On Farm Energy Consumption (MWh) | 25,363 |
| Energy Consumption for Diversion Pumping (MWh) | 1,236 |
| Total Energy Consumption (MWh) | 26,599 |
| Average Total Energy Consumption (kWh/ac) | 415.1 |

TABLE 11: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: 11 Subarea: Puget Sound*

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | | | | | |
| Hand Move | 11,876 | 46,756 | 58,632 | 2.3 | 776.7 |
| Side Roll | 6,000 | 12,000 | 18,000 | 2.6 | 897.3 |
| Solid Set | 2,000 | 3,000 | 5,000 | 2.0 | 704.9 |
| Permanent | | | | | |
| Big Gun | 5,000 | 5,000 | 10,000 | 2.3 | 1,405.6 |
| Gravity Systems | | | | | |
| Return Recovery | | | | | |
| Drip/Trickle | 200 | 300 | 500 | 1.3 | 192.0 |
| TOTAL | 25,076 | 67,056 | 92,132 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 50 |
| Surface Water Lift (ft) | 25 |
| Combined Lift (ft) | 32 |
| Average Rate of Water Application (acft/ac) | 2.3 |
| Average On Farm Energy Consumption (kWh/ac) | 861.4 |
| Total On Farm Energy Consumption (MWh) | 79,367 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 79,367 |
| Average Total Energy Consumption (kWh/ac) | 861.4 |

*Subregion 11 includes only one subarea--Puget Sound.

TABLE 12: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 12 Subarea: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 8,494 | 475 | 8,969 | 1.9 | 760.1 |
| Hand Move | 10,151 | 769 | 10,920 | 2.4 | 742.7 |
| Side Roll | 20,864 | 1,134 | 21,998 | 2.5 | 779.4 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | 220,261 | 220,261 | 3.7 | 0.3 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 39,509 | 222,639 | 262,148 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 34 |
| Surface Water Lift (ft) | 11 |
| Combined Lift (ft) | 2 |
| Average Rate of Water Application (acft/ac) | 3.5 |
| Average On Farm Energy Consumption (kWh/ac) | 122.6 |
| Total On Farm Energy Consumption (MWh) | 32,135 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 32,135 |
| Average Total Energy Consumption (kWh/ac) | 122.6 |

*Subregion 12 includes subareas Fort Rock, Christmas Lake, Chewaucan; Silvies, Silver, Donner und Blitzen; and Alvord, Catlow, Warner.

TABLE 12-1: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 12 Subarea: Fort Rock, Christmas Lake, Chewaucan

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 2,239 | 125 | 2,364 | 2.0 | 777.8 |
| Hand Move<br>Side Roll | 5,476 | 139 | 5,615 | 2.5 | 800.9 |
| Solid Set<br>Permanent<br>Big Gun<br>Gravity Systems | | 65,074 | 65,074 | 3.7 | 0.0 |
| Return Recovery<br>Drip/Trickle | | | | | |
| TOTAL | 7,715 | 65,338 | 73,053 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 31 |
| Surface Water Lift (ft) | 10 |
| Combined Lift (ft) | 1 |
| Average Rate of Water Application (acft/ac) | 3.6 |
| Average On Farm Energy Consumption (kWh/ac) | 86.7 |
| Total On Farm Energy Consumption (MWh) | 6,336 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 6,336 |
| Average Total Energy Consumption (kWh/ac) | 86.7 |

TABLE 12-2: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 12 Subarea: Silvies, Silver, Donner und Blitzen

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 3,746 | 350 | 4,096 | 1.9 | 738.9 |
| Hand Move | 8,226 | 769 | 8,995 | 2.4 | 736.4 |
| Side Roll | 9,332 | 873 | 10,205 | 2.4 | 758.0 |
| Solid Set<br>Permanent<br>Big Gun<br>Gravity Systems | | 88,151 | 88,151 | 3.7 | 0.0 |
| Return Recovery<br>Drip/Trickle | | | | | |
| TOTAL | 21,304 | 90,143 | 111,447 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 39 |
| Surface Water Lift (ft) | 10 |
| Combined Lift (ft) | 2 |
| Average Rate of Water Application (acft/ac) | 3.4 |
| Average On Farm Energy Consumption (kWh/ac) | 156.0 |
| Total On Farm Energy Consumption (MWh) | 17,385 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 17,385 |
| Average Total Energy Consumption (kWh/ac) | 156.0 |

TABLE 12-3: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 12 Subarea: Alvord, Catlow, Warner

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 2,509 | | 2,509 | 2.0 | 777.8 |
| Hand Move | 1,925 | | 1,925 | 2.5 | 772.3 |
| Side Roll | 6,056 | 122 | 6,178 | 2.5 | 795.2 |
| Solid Set | | | | | |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | 67,036 | 67,036 | 3.6 | 0.9 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 10,490 | 67,158 | 77,648 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 24 |
| Surface Water Lift (ft) | 12 |
| Combined Lift (ft) | 1 |
| Average Rate of Water Application (acft/ac) | 3.4 |
| Average On Farm Energy Consumption (kWh/ac) | 108.4 |
| Total On Farm Energy Consumption (MWh) | 8,414 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 8,414 |
| Average Total Energy Consumption (kWh/ac) | 108.4 |

TABLE 13: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: 13 Subarea: Klamath*

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 1,905 | 1,325 | 3,230 | 1.9 | 771.7 |
| Hand Move | 7,657 | 11,195 | 18,852 | 2.4 | 764.4 |
| Side Roll | 10,460 | 15,296 | 25,756 | 2.4 | 782.7 |
| Solid-Set | 2,528 | 3,697 | 6,225 | 2.2 | 709.2 |
| Permanent | | | | | |
| Big Gun | 185 | 450 | 635 | 2.4 | 1,366.0 |
| Gravity Systems | | 203,914 | 203,914 | 3.3 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 22,735 | 235,877 | 258,612 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 89 |
| Surface Water Lift (ft) | 10 |
| Combined Lift (ft) | 3 |
| Average Rate of Water Application (acft/ac) | 3.1 |
| Average On Farm Energy Consumption (kWh/ac) | 163.7 |
| Total On Farm Energy Consumption (MWh) | 42,343 |
| Energy Consumption for Diversion Pumping (MWh) | 16,202 |
| Total Energy Consumption (MWh) | 58,545 |
| Average Total Energy Consumption (kWh/ac) | 226.4 |

*Subregion 13 includes only one subarea--Klamath.

TABLE 14: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: 14 Subarea: Bear River*

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 3,029 | | 3,029 | 1.6 | 760.2 |
| Hand Move | 34,552 | 72,969 | 107,521 | 2.2 | 871.6 |
| Side Roll | 12,780 | 26,631 | 39,411 | 2.2 | 891.4 |
| Solid Set | 1,514 | | 1,514 | 1.8 | 719.0 |
| Permanent | | | | | |
| Big Gun | | | | | |
| Gravity Systems | | 85,105 | 85,105 | 3.2 | 0.0 |
| Return Recovery | | | | | |
| Drip/Trickle | | | | | |
| TOTAL | 51,875 | 184,705 | 236,580 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 250 |
| Surface Water Lift (ft) | 10 |
| Combined Lift (ft) | 34 |
| Average Rate of Water Application (acft/ac) | 2.5 |
| Average On Farm Energy Consumption (kWh/ac) | 558.9 |
| Total On Farm Energy Consumption (MWh) | 132,233 |
| Energy Consumption for Diversion Pumping (MWh) | 0 |
| Total Energy Consumption (MWh) | 132,233 |
| Average Total Energy Consumption (kWh/ac) | 558.9 |

*Subregion 14 includes only one subarea--Bear River.

TABLE 15: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Idaho Subregion: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 120,683 | 58,384 | 179,067 | 2.0 | 1,062.0 |
| Hand Move | 483,013 | 313,840 | 796,853 | 2.5 | 1,093.0 |
| Side Roll | 216,077 | 123,290 | 339,367 | 2.6 | 1,185.5 |
| Solid Set | 44,222 | 27,304 | 71,526 | 3.1 | 1,261.0 |
| Permanent | 345 | 213 | 558 | 3.1 | 1,229.9 |
| Big Gun | 62 | 574 | 636 | 1.7 | 1,105.4 |
| Gravity Systems | 253,388 | 2,189,793 | 2,443,181 | 3.7 | 160.4 |
| Return Recovery | 3,000 | 12,000 | 15,000 | 2.4 | 252.2 |
| Drip/Trickle | | | | | |
| TOTAL | 1,120,790 | 2,725,398 | 3,846,188 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 266 |
| Surface Water Lift (ft) | 11 |
| Average Rate of Ground Water Application (acft/ac) | 2.7 |
| Average Rate of Surface Water Application (acft/ac) | 3.5 |
| Average Rate of Water Application (acft/ac) | 3.2 |
| Average On Farm Energy Consumption (kWh/ac) | 507.2 |
| Total On Farm Energy Consumption (MWh) | 1,950,748 |
| Energy Consumption for Diversion Pumping (MWh) | 213,286 |
| Total Energy Consumption (MWh) | 2,164,034 |
| Average Total Energy Consumption (kWh/ac) | 562.6 |

*Idaho includes portions of subregions 1, 5 and 6 along with subregions 4 and 14.

TABLE 16: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Oregon Subregion: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 24,218 | 77,169 | 101,387 | 2.4 | 1,659.6 |
| Hand Move | 123,991 | 281,588 | 405,579 | 2.0 | 731.1 |
| Side Roll | 85,924 | 247,992 | 333,916 | 2.5 | 1,048.6 |
| Solid Set | 4,858 | 10,625 | 15,483 | 2.6 | 1,157.9 |
| Permanent | 2,604 | 8,675 | 11,279 | 2.6 | 931.1 |
| Big Gun | 10,472 | 18,941 | 29,413 | 1.6 | 981.2 |
| Gravity Systems | 327 | 939,449 | 939,776 | 3.8 | 0.3 |
| Return Recovery | | 13,560 | 13,560 | 2.2 | 61.0 |
| Drip/Trickle | 62 | 210 | 272 | 1.6 | 239.0 |
| TOTAL | 252,456 | 1,598,209 | 1,850,665 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 78 |
| Surface Water Lift (ft) | 37 |
| Average Rate of Ground Water Application (acft/ac) | 2.0 |
| Average Rate of Surface Water Application (acft/ac) | 3.2 |
| Average Rate of Water Application (acft/ac) | 3.0 |
| Average On Farm Energy Consumption (kWh/ac) | 471.9 |
| Total On Farm Energy Consumption (MWh) | 873,349 |
| Energy Consumption for Diversion Pumping (MWh) | 70,469 |
| Total Energy Consumption (MWh) | 943,818 |
| Average Total Energy Consumption (kWh/ac) | 510.0 |

*Oregon includes portions of subregions 5, 6, 7, 8 and 10 along with subregions 9, 12 and 13.

TABLE 17: 1975 Water Requirements and Energy Consumption for Irrigation Systems

State: Washington Subregion: *

| | Ground Water | Surface Water | Combined | | |
|---|---|---|---|---|---|
| System | Acres | Acres | Acres | Water Application acft/ac | Energy Use kWh/ac |
| Center Pivot | 105,460 | 94,680 | 200,140 | 2.4 | 1,425.4 |
| Hand Move | 45,038 | 155,402 | 200,440 | 3.3 | 1,351.2 |
| Side Roll | 55,995 | 359,442 | 415,437 | 3.3 | 1,447.4 |
| Solid Set | 7,156 | 23,779 | 30,935 | 3.9 | 1,591.1 |
| Permanent | 4,004 | 72,746 | 76,750 | 5.0 | 1,853.3 |
| Big Gun | 5,800 | 7,700 | 13,500 | 2.6 | 1,667.3 |
| Gravity Systems | 22,993 | 629,154 | 652,147 | 5.6 | 87.1 |
| Return Recovery | 1,000 | 1,200 | 2,200 | 3.3 | 764.5 |
| Drip/Trickle | 565 | 2,335 | 2,900 | 3.2 | 756.3 |
| TOTAL | 248,011 | 1,346,438 | 1,594,449 | | |

| | |
|---|---|
| Ground Water Lift (ft) | 287 |
| Surface Water Lift (ft) | 26 |
| Average Rate of Ground Water Application (acft/ac) | 2.8 |
| Average Rate of Surface Water Application (acft/ac) | 4.3 |
| Average Rate of Water Application (acft/ac) | 4.2 |
| Average On Farm Energy Consumption (kWh/ac) | 898.2 |
| Total On Farm Energy Consumption (MWh) | 1,432,065 |
| Energy Consumption for Diversion Pumping (MWh) | 1,048,036 |
| Total Energy Consumption (MWh) | 2,480,101 |
| Average Total Energy Consumption (kWh/ac) | 1,555.5 |

*Washington includes portions of subregions 1, 6, 7, 8 and 10 along with subregions 2, 3 and 11.

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