

GROW BIOINTENSIVE Garden Plans for Willits

Codes used in Plans

CC=Carbon and Calorie crops, weight efficient for food and high biomass for compost
 IM=harvested before maturity for compost
 NC=Nitrogen Crops for compost
 SR=Special Root crop, area efficient
 W=Weight efficient for food
 A=Area efficient for food
 V=Vegetable for vitamins and minerals and/or compost

For nutrition information go to the USDA Health e Tech SR Search
 USDA Food Search for Windows database

The area calculations of these plans are for growing space only. Non-growing space for paths and tool storage, etc. will require additions to the total area needed per person. Just accounting for paths between beds is likely to increase area needs by about 30%. So a 3000 sq ft plan actually needs 3900 sq ft or more.

Plan I for Irrigated Areas

Theoretical garden used in plans has 1000 sq ft of space for non-perennial crops.

Winter Portion

<u>Area (sq ft)</u>	<u>Plant</u>	<u>Category</u>	<u>Potential Bed Dates</u>	<u>Bed Months</u>
500	broadcast grains (wheat & rye) [NC intercropped with vetch and fava]	CC/IM	Oct-Mar	5
190	wheat [NC intercropped with fava]	CC+W	Oct-July	8-9
50	rye [NC intercropped with Austrian peas]	CC+W	Oct-July	8-9
40	oats [NC intercropped with fava]	CC+W	Oct-July	8-9
150	barley [NC intercropped with fava]	CC+W	Oct-June	7-8
40	garlic and leeks	SR	Oct-June	7-8
15	onions and shallots	V	Oct-June	7-8
8	root vegetables (carrots, beets, radishes)	V	Oct-May	6-7
7	winter greens (kale, cabbage, chard, lettuce, spinach)	V	Oct-May	6-7
1000				

Notes: Winter grains are interplanted with legumes, so compost built from these materials will have a 45:1 nitrogen ratio. The grain to legume ratio is about 4:1. About half of the area for winter grains and legumes will be composted before maturity to make room for summer crops. The other half will go to maturity for food. Rye and Austrian peas work well together since both tend to stay low until Spring. Use hullless varieties of oats and barley.

Summer Portion

<u>Area (sq ft)</u>	<u>Plant</u>	<u>Category</u>	<u>Potential Bed Dates</u>	<u>Bed Months</u>
200	potatoes	SR	Apr-Aug	4-6
30	parsnips	SR	Apr-Aug	4
120	Jerusalem artichoke	SR	Apr-Aug	5
30	leek	SR	Apr-Sept	6
80	Sunflower	CC+W	May-Sept	4
200	60-day corn and/or Japanese millet	CC+W	May-Oct	2-3
165	amaranth	CC+W	Apr-Oct	4
100	dry beans (pinto, lentil, chickpea) (W)	V	May-Sept	4
10	onions	V	Apr-Oct	4-6
30	tomatoes and peppers	V	Apr-Oct	4
35	other vegetables (peas, carrots, beets, broccoli, cabbage, chard, lettuce, spinach, parsley, cucumbers, eggplant, melons, zucchini, winter squash)	V	Apr-Oct	2-4

1000

Notes: It may be necessary to plant seedlings of summer crops within winter grain beds as the grains are finishing maturation, e.g., tomatoes. Barley will mature in late Spring. Because of its deep root system, rye may produce a double crop without irrigation. Perhaps replace some summer grain areas with a persistent rye crop and test this. Two-month varieties of millet, corn and amaranth need to follow mature winter grain crops if they don't come out until July, i.e., "catch crops." Catch crop dry bean varieties include French horticultural, Taylor's horticultural and Coco Rubico. If the winter grains mature by early June, other grains are possible. 65-day varieties of potatoes may be used for areas cleared only by late spring. April-planted potatoes will probably produce the best yields. Japanese millet requires a special thresher. Annual food data underestimate protein and calcium because Jerusalem artichoke production only includes calories and weight estimates.

Check on 60-70/15-30/5-15 goals

<u>Category</u>	<u>Area</u>	<u>Food Area</u>	<u>Area %</u>	
CC		1375	875	69
SR		420	420	21
V		205	205	10
	2000		1500	

<u>Calories/Yr</u>	<u>Protein(g)/Yr</u>	<u>Calcium(mg)/Yr</u>	<u>Food Eaten(lb)/Day</u>
423200	13570	122500	3.4
% person need	48	73	59

Winter to Summer Transition

<u>Date</u>	<u>Activity</u>	<u>Area out</u>	<u>Area in</u>
Mar-Apr	Pull out the grain and NC compost/cover crop	500	
Mar-May	Put in potatoes, parsnips, Jerusalem artichokes and assorted vegetables		370
May-June	Pull out mature barley, root vegetables and winter greens	165	
May-June	Put in sunflower, dry beans and assorted vegetables		225
June-July	Pull out wheat, oats, rye, garlic, onions and shallots	335	
June-July	Put in amaranth, corn and/or millet, tomatoes and peppers		405

From the above calculations, about 2200 sq ft are needed to feed one person given plentiful irrigation.

Summer to Winter Transition

<u>Date</u>	<u>Activity</u>	<u>Area out</u>	<u>Area in</u>
Aug-Sept	Pull out potatoes, parsnips and Jerusalem artichokes	350	
Sept-Oct	Pull out fava beans, dry beans and assorted vegetables	200	
Oct	Put in the grain and NC compost/cover crop in above areas		500
Oct	Pull out sunflower, amaranth, corn and/or millet, and assorted vegetables	445	
Oct	Put in wheat, rye, oats and barley plus NC intercropped		430
Oct-Nov	Put in garlic, onions, shallots, root and vegetables		70

The GROW BIOINTENSIVE method aims to grow a complete diet and improve or maintain soil fertility by composting crop residue. To achieve these goals, crops are classified in a few ways and the gardener must select appropriate crops in a proper proportion. The largest area is sown in crops that produce edible calories with little weight and also produce high biomass for the compost. These are primarily grains and take up about 60% of the area. Next are crops that produce many calories per area sown, but some may be high in water content so are less weight efficient. This category is mainly potatoes and is about 30% of area planted. The remaining 10% of the area is grown in soft vegetables for variety of taste, vitamins and minerals.

These plans are for two main growing seasons. October through June corresponds to the winter season, and April through October to the summer season. The overlapping months reflects when the crops from one season are harvested and the other season's planted.

These plans are presented for 1000 square feet (sq ft) of space for non-perennial crops. They do not include berries, trees or grapes. Useful non-woody perennials, including rhubarb, asparagus, artichokes and tree collards, are also not included.

The Willits area climate, as with any, presents certain constraints and opportunities. Winter grains can't reliably be harvested before July, which means that many summer crops can't be planned in areas dedicated to winter grains. Legume cover crops, which improve soil nutrient status, are used within the winter grain beds to prepare the soil for summer grains and potatoes.

Plan N for Non-irrigated Areas

Area (sq ft) Plant

- 300 wheat [NC intercropped with fava]
- 200 rye [NC intercropped with Austrian peas]
- 100 oats [NC intercropped with fava]
- 150 barley [NC intercropped with fava]
- 50 parsnips
- 50 burdock
- 50 garlic and leeks
- 45 onions and shallots
- 35 root vegetables (carrots, beets, radishes)
- 20 winter greens (kale, cabbage, chard, lettuce, spinach)

1000

<u>Category</u>	<u>Potential Bed Dates</u>	<u>Bed Months</u>
CC+W	Oct-July	8-9
CC+W	Oct-July	8-9
CC+W	Oct-July	8-9
CC+W	Oct-June	7-8
SR	Oct-June	7-8
SR	Oct-June	7-9
SR	Oct-June	7-8
V	Oct-June	7-8
V	Oct-May	6-7
V	Oct-May	6-7

<u>Category</u>	<u>Area</u>	<u>Area %</u>
CC	750	75
SR	150	15
V	100	10
1000		

<u>Calories/Yr</u>	<u>Protein(g)/Yr</u>	<u>Calcium(mg)/Yr</u>	<u>Food Eaten(lb)/Day</u>
250,328	9717	100,837	2
29	52	55	35

Percent of per person need

From the above calculations, about 3500 sq ft are required to feed one person given this non-irrigated plan.

Plan PI for Partially Irrigated Areas

Winter Portion

<u>Area (sq ft)</u>	<u>Plant</u>	<u>Category</u>	<u>Potential Bed Dates</u>	<u>Bed Months</u>
500	broadcast grains (wheat & rye) [NC intercropped with vetch and fava]	CC/IM	Oct-Mar	5
190	wheat [NC intercropped with fava]	CC+W	Oct-July	8-9
50	rye [NC intercropped with Austrian peas]	CC+W	Oct-July	8-9
40	oats [NC intercropped with fava]	CC+W	Oct-July	8-9
150	barley [NC intercropped with fava]	CC+W	Oct-June	7-8
20	garlic and leeks	SR	Oct-June	7-8
20	parsnips	SR	Oct-June	7-8
10	onions and shallots	V	Oct-June	7-8
12	root vegetables (carrots, beets, radishes)	V	Oct-May	6-7
8	winter greens (kale, cabbage, chard, lettuce, spinach)	V	Oct-May	6-7
1000				

Summer Portion

<u>Area (sq ft)</u>	<u>Plant</u>	<u>Category</u>	<u>Potential Bed Dates</u>	<u>Bed Months</u>
170	potatoes	SR	Apr-Aug	4-6
30	parsnips	SR	Apr-Aug	4
100	Jerusalem artichoke	SR	Apr-Aug	5
80	corn, flour	CC+W	May-Sept	4
60	dry beans (pinto, lentil, chickpea) (W)	V	May-Sept	4
10	onions and leeks	V	Apr-Oct	4-6
25	tomatoes and peppers	V	Apr-Oct	4
25	other vegetables (peas, carrots, beets, broccoli, cabbage, chard, lettuce, spinach, parsely, cucumbers, eggplant, melons, zucchini, winter squash)	V	Apr-Oct	2-4
500				

The 500 sq ft of broadcast grains plus NC will boost biomass for the compost above the amount portrayed by the food-only calculations shown here.

<u>Category</u>	<u>Area</u>	<u>Area %</u>
CC	1010	67
SR	340	23
V	150	10
	1500	

This plan grows large areas of grains and compost crops in the winter and reduces the summer garden to half the total area to conserve water. Whereas grains are produced in the winter, area efficient root crops are emphasized in the summer. Annual food data underestimate protein and calcium because Jerusalem artichoke production only includes calories and weight estimates.

<u>Calories/Yr</u>	<u>Protein(g)/Yr</u>	<u>Calcium(mg)/Yr</u>	<u>Food Eaten(lb)/Day</u>
316,551	9582	74,540	2.68
36	51	41	47

From the above calculations, about 2800 sq ft are needed to feed one person using this plan.